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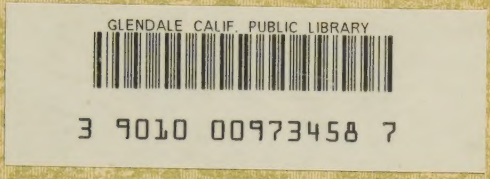
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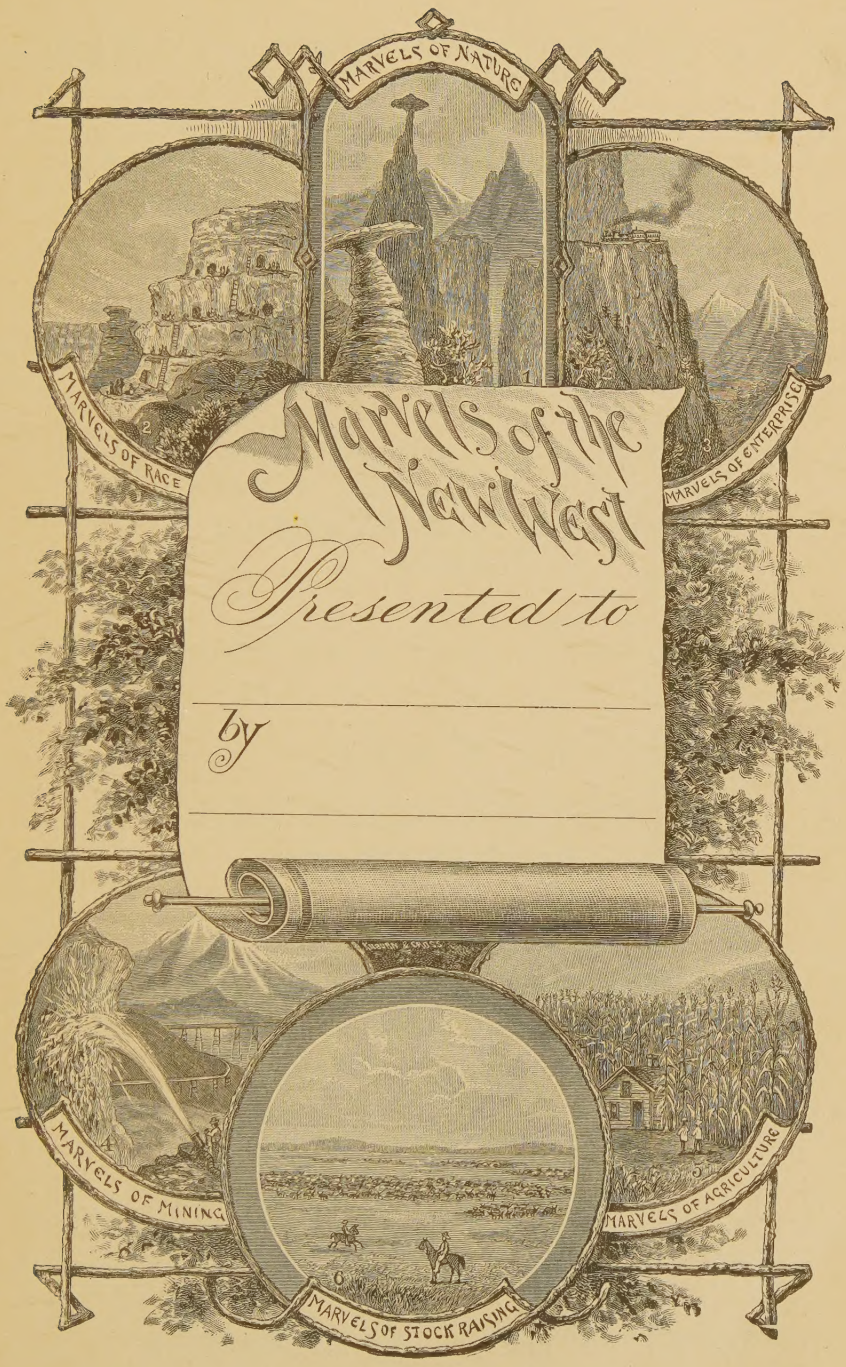
MARVELS OF NATURE
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Marvels of the New West
Presented to
by
MARVELS OF MINING
4
MARVELS OF AGRICULTURE
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6

MARVELS OF THE NEW WEST.

A VIVID PORTRAYAL OF THE UNPARALLELED MARVELS
IN THE VAST WONDERLAND WEST OF
THE MISSOURI RIVER.

SIX BOOKS IN ONE VOLUME,

COMPRISING

MARVELS OF NATURE, MARVELS OF RACE, MARVELS OF ENTERPRISE, MARVELS OF MINING, MARVELS OF STOCK-RAISING, AND MARVELS OF AGRICULTURE,

GRAPHICALLY AND TRUTHFULLY DESCRIBED

BY

WILLIAM M. THAYER,

AUTHOR OF OVER TWENTY STANDARD WORKS, INCLUDING "THE WHITE HOUSE SERIES OF BIOGRAPHIES," AND "YOUTHS' HISTORY OF THE REBELLION," IN 4 VOLS.

ILLUSTRATED WITH

THREE HUNDRED AND SEVENTY-NINE FINE ENGRAVINGS AND MAPS.

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INTRODUCTION.

THE NEW WEST — where is it? what is it? That portion of our great country lying between the Missouri River and the Pacific Ocean, embracing the States and Territories of Kansas, Nebraska, Dakota, Colorado, Wyoming, Montana, Utah, Idaho, Oregon, Washington, Nevada, Arizona, New Mexico, and California. Of itself a mighty empire! This New West contains more than half the territory of our entire country. The territorial measurement of the United States, from the Atlantic to the Pacific, is 3,025,600 square miles. The States and Territories of the New West embrace 1,532,142 square miles of it, which is 19,342 square miles more than one-half. Its magnitude is a marvel. How few people from Maine to Ohio have supposed that more than one-half of the area of their country lies between the Missouri River and the Pacific Ocean! Without stopping to consult the map, or the Bureau of Statistics, they have been indulging the thought that "the jumping-off place" was not far west of the Mississippi. Reliable information concerning the New West is of so recent date that the mass of the people in the East are not posted as to the actual facts. "Facts are stranger than fiction" is a sentiment especially applicable to this unsettled, but rapidly settling part of our land. Were some well-posted citizen of the New West to present the actual facts about that domain to the inhabitants of the Eastern States, a multitude of hearers would denounce him as a liar, or pity him for possessing more imagination than judgment. It is because so much of the truly marvellous is interwoven with the history and present status of that Eldorado.

To recur again to territorial limits. The country east of the Mississippi is divided into States so small, comparatively, that their inhabitants are not prepared to appreciate the magnitude of the States and Territories west of the "Father of waters." They are so accustomed to States containing from two thousand to fifty thousand square miles, that they are quite unprepared to comprehend the more distant ones, three and four times as large. Kansas is almost ten times larger than Massachusetts, nearly seventeen times larger than Connecticut, sixty-five times larger than Rhode Island; and its area more than equals the combined area of all the New England States, with Maryland and Delaware added. Colorado is twelve times larger than Massachusetts, and twenty-six times larger than Connecticut. One hundred Rhode Islands can be set down upon its 104,500 square miles. One of its counties (Gunnison) is larger than Massachusetts and Rhode Island combined. It has four magnificent parks, situated in the mountains, from seven thousand to nine thousand feet above the sea, the smaller of which is equal to two Rhode Islands; and the State of Massachusetts could be set within the larger. These four parks contain as many acres as Massachusetts, Connecticut, and Rhode Island together. Arizona, New Mexico, Montana, Nevada, Dakota, and California are larger than Colorado. California is twenty-two times larger than Massachusetts, nearly three times as large as all the New England States, and its area exceeds the united area of New York, Pennsylvania, Ohio, Indiana, and Maryland. Eighteen Massachusetts can be put into Dakota, with ample room left to receive the little State of Rhode Island. Montana is almost as large as Dakota, and can spread seventeen Massachusetts and one Rhode Island over its ample surface. New Mexico, Arizona, and Nevada are not much behind their gigantic neighbors; for their united territory is equal to one-tenth of our entire national domain, and more than equal to the combined area of New York, Pennsylvania, New Jersey, Maryland, Ohio, Illinois, Indiana, and South Carolina, together with all the New England States.

These are marvellous boundaries; and they represent the grand scale upon which our New Western country is laid out, as well as the

magnitude of its social, commercial, and educational enterprises. Nothing is done there in a small way. Human plans are as large as the States. Nothing is too large or too difficult to be undertaken. Enterprises are prodigious. The amount of business is almost incredible. Enormous contracts, enormous profits, enormous losses, are the order of the day. "Do you pretend to say that nothing is impossible in the work of constructing railways?" inquired a lawyer in a Colorado court of a witness who was a railroad official. "I pretend to say," replied the witness, "that, give us a starting-point, and the objective point to be reached, with a railroad company having a plenty of money behind, we will reach it." It is on such a magnificent scale that things are done in the New West. Nothing narrow or picayune, but broad and large! "Our railroad company wants to borrow *fifty millions*," said a railway official in our hearing. FIFTY MILLIONS! That fairly represents the magnitude of Western work. Men make money by the million, and sometimes they lose it by the million, though not often. They aspire to the largest business, the greatest triumphs of human effort, and the quickest possible results. Hence, the handsomest and richest city, the best school system, the finest public buildings, and the most wonderful growth are found on what was but recently "The Great American Desert." Given enterprise on a grand scale, and even the "desert will blossom as the rose!"

Marvels are constantly multiplying in the New West. Surprises are as common there as commonplace is in the East. The rapid increase of its population is as great a marvel as a cañon, or a railroad over Marshall Pass. The time is coming when the population west of the Missouri River will exceed the population east of it. Kansas can accommodate thirty millions of people without being crowded more than Massachusetts will be fifty years from now. Colorado can support more than Kansas; and so can Utah, Wyoming, Idaho, and Oregon. Arizona, Nevada, and New Mexico have room for forty millions each. Dakota and Montana can maintain sixty millions each, and California exceed both of them in the number of its inhabitants. Nebraska and Washington Territory will fall little behind

Kansas in capacity for population. It is not without authority, then, that some statisticians claim that the United States can support in the future, when her wonderful resources have had time to develop, a population of 3,600,000,000 — more than twice the number of people now dwelling on the face of the earth! The New West, with its larger territory, its inexhaustible mines of gold, silver, copper, lead, iron, and coal, its richer lands, more genial and healthier climate, its grander scenery and irrepressible spirit of enterprise, must command its full share of these teeming millions. Its influence must become potent to determine, if not to control, the destiny of our great Republic. As will be its domestic, social, intellectual, moral, and Christian character, so will be the power and perpetuity of our national government. The nation will rise or fall with the New West. The latter's increasing wealth and enterprise must exert a controlling influence upon our political history. The minds that manage and drive there, must prove more or less potential at the seat of government. Mind is master everywhere: and mind that is the life and soul of Western enterprise, thrift, and greatness, must become masterful in the councils of the nation. Time only is necessary to settle the matter; and time is always an element of success or failure.

Large numbers of Eastern people suppose that even now the "Far West," as they call the New West, is a rude, rough, half-civilized frontier, where men who escape the Indian scalping-knife may fall by the shot of the desperado. They are not prepared for the statement that the average society of the New West will compare favorably with that of New England, and that the most dangerous elements of humanity in Western cities, and even in mining towns, is not so bad as the lowest vicious classes of New York and other Eastern cities. But it is even so. That the present population between Missouri River and the Pacific Ocean will compare favorably with that of Eastern States in virtue and intelligence, is a marvel; and the cause is to be found in Eastern influences. New England is found throughout the New West; it is everywhere. Go where he will, the traveller is continually reminded of New England institutions and society.

New England laid the foundations there; and New England is rearing the walls and getting them ready for the cap-stone. State capitols, court-houses, hotels, city halls, opera houses, universities, school buildings, and houses of worship are like those of Massachusetts, only better. The children's love and memory of home reproduce the institutions of their childhood, made more conspicuous by modern improvements. So the New West becomes the rival of the East.

We have used the phrase "Far West," but really there is no such locality now. We travelled ten thousand miles in "the Rocky Mountain region," but failed to find the "Far West." We scarcely escaped from the East. "Are you from the East?" inquired a stranger of us in Colorado. "Yes, just arrived," we answered. "And so am I from the East," responded my questioner. "May I ask you what part of the East you came from?" we continued. "From Iowa," he said. So I found that "far west" is east out there.

Over the range on the Pacific Slope, at Gunnison City, a gentleman accosted us in a familiar, genial way, —

"Stranger, are you from the East?"

"Yes, sir; and I expect to return there soon."

"I hope you will carry a good report of us back, for I come from the East," he added pleasantly.

"Most certainly I shall, for I am really smitten with this new country," we answered. "And what part of the East are you from?"

"Kansas," he replied, to our surprise. "I came here for my health three years ago. I am not yet well, though much improved; and I may yet find it necessary to go west."

We gave it up — there is no West really; the country has become mostly East. The East dogged our steps everywhere; and the West, like some *ignis fatuus* of the meadow, receded from our view as we journeyed on. The waggish Coloradean was less a wag than he supposed, when he said, "The West! the West! Why, the West is kicked 'over the range' into the Pacific Ocean." Whether true or not, we saw no one who admitted that he had reached the West. At the most distant point we struck, men were *going* West. We can say with another tourist, that the further we went, the more we were

strengthened in the belief that the wise men did come from the East. Whether the East is Westernized, or the West Easternized, is a question the reader must settle in his own mind.

In travelling over the New West we found ample proof of the incorrect ideas concerning it prevailing in the East. When news of the massacre of Mr. Meeker and his co-workers, by the Ute Indians, reached the Eastern States, large numbers of terrified fathers and mothers, wives and sisters, and other friends, wrote to their kindred to hasten home. They seemed to think that the country beyond the Missouri River was a narrow belt over which a single tribe of Indians in arms could sweep in bloody triumph. They did not know but that the massacre occurred at the very door of their relatives' habitations. The friends might have been living in Montana or Nebraska, or California; they did not know that it was not all the same as Colorado, where the butchery occurred. An Eastern man sickened and died in Denver, and the tidings of his decease were transmitted to his family friends, the most afflicted of whom immediately wrote to inquire whether there were neighbors to render him necessary aid. The intelligence was returned, "he had about *forty thousand* neighbors," which was the population of Denver at that time. Friends had no idea that he was dwelling in one of the most marvellous cities on the continent. They appeared to think that, dwell where he might, he must be isolated, and destitute of those comforts which a dying man ought to command. Ten years ago a young man from New England was travelling horseback in the New West for his health. Tramps were in their glory and strength in the East, at that time; so that, when his letter came describing his journeying alone from place to place, his parents, though intelligent people, were very much alarmed; and they spoiled a whole sheet of paper in communicating to him their fears, closing their well-meant counsel by emphasizing, "Beware of Tramps!" They were not a little surprised to receive an answer, in due time, "No Tramps Here!" As tramps were then the principal scare in New England, they supposed that they must be a greater scare in the "Far West." Four years after the rush to Leadville, a Connecticut gold-seeker

cast his fortunes with that crowd. His parents forwarded to him by mail various mailable articles, which they supposed could not be purchased in that distant mining camp. They were very much surprised, however, to receive the following answer to their inquiry, "Can you buy rubber boots there?" "YES, PIANOS IF I WANT." Pianos in a mining camp, more than two thousand miles away, was the last thing they had dreamed of; and they very wisely concluded that their knowledge of the Western country was somewhat limited.

Now, this book is designed to enlighten those who have never visited the New West. To make it "next to seeing," a large number of pictorial illustrations are introduced, without which it is quite impossible for this class to appreciate its marvels. No person can understand a cañon by merely looking at a stereopticon view, unless he has seen a cañon with his own eyes. But transfer that view to a book, by the engraver's art, accompanied by a careful description, and the reader can readily take it in. That is "next to seeing." Therefore, the numerous illustrations in this volume occupy a prominent place in its plan. Indeed, in one sense, we may truly say that more dependence is placed upon the pictorial illustrations than the text, to convey the information intended. They are not designed merely for entertainment, but also for instruction. Through the objects illustrated, the character, thrift, and aims of the people appear. Public buildings exhibit the public enterprise of town or city. Good schoolhouses indicate general intelligence, and the value put upon education by the citizens. Houses of worship are the expression of the noblest and best sentiments of the heart. For this reason, we claim a special mission for the many illustrations in this volume. They are furnished at heavy expense; but are indispensable to the author's purpose. It would be quite impossible to learn what the New West is without them.

This book does not contain all the marvels of the New West, by any means. It does not contain all of even the *marvellous* marvels. An octavo volume is quite too limited to admit the record of all such objects, which abound in the Rocky Mountain district. Not all even of the marvels selected especially for this volume are found herein;

for our space was filled before the list was exhausted. We furnish marvels enough, however, to satisfy the most incredulous that the New West has been very properly called "WONDERLAND."

One feature of this volume is the introduction of the opinions of other men — men of science, explorers, travellers, pleasure-seekers, and sight-seers generally. To risk our own opinion alone, based upon our personal observation and research, was altogether too hazardous. The danger of being stigmatized as the most unscrupulous falsifier of the age or land, was too much for our flesh and blood to face. So we have introduced a large number of descriptions of marvels by other authors, that readers may understand we neither exaggerate nor lie. At least, dear reader, you will find us in excellent company, and quite enough of it, too, whether you are inclined to doubt our veracity or not. We are willing to rest our reputation for truthfulness and honor here, after the foregoing explanation.

MARVELS! That idea is adhered to throughout the work. Marvels of ancient races; marvels of scenery; marvels of railroading over the highest mountains; marvels of growth; marvels of agriculture; marvels of mining; marvels of stock-raising; and other marvels we need not enumerate here. Nothing but marvels occupy these pages. The most remarkable things of the New West, and not the commonplace — these are what we lay before the reader, for these express the possibilities of the New West as the commonplace cannot. Such as they are, we commend them to the study of young and old, and commit our humble venture to the considerate judgment of the public.

THE AUTHOR

FRANKLIN, MASS., 1887.

MARVELS OF THE NEW WEST.

MARVELS OF THE NEW WEST.

I. MARVELS OF NATURE.

NATURE has wonderfully diversified our whole country; but her greatest MARVELS are found between the Missouri River and the Pacific coast. "I have travelled through Switzerland and Italy, and seen the beauty and grandeur of Alpine scenery," said a member of the British Parliament to the author, in Colorado; "but I have seen nothing that surpasses the scenery of the Rocky Mountain region." Such is the almost universal testimony of tourists. Not a few tourists claim that the scenery of the New West as a whole surpasses anything to be seen in Europe; and they have one fact to support their claim; viz., the Rio Grande Railroad Company forwarded many photographic views of Rocky Mountain scenery to the International Exposition, at Amsterdam, Holland, in 1883, and received the premium therefor, notwithstanding that Switzerland was a contestant for the honor. The Colorado commissioner at Amsterdam, in conveying the award to the Railway Company, said: "The committee specially appointed to report upon the several exhibits of railroad scenery, which included a great number from Switzerland and those of the Denver and Rio Grande Railway, have awarded to the latter railway the highest premium. This will allow the Rio Grande to lay claim to passing through the finest scenic country in the world, not excepting Switzerland, which heretofore stood unequalled. The views are proving one of the centres of attraction to the thousands who attend their exhibit daily."

Bayard Taylor says: "The view of the Rocky Mountains from the Divide near Kiowa Creek is considered one of the finest in Colorado. From the breezy ridge, between scattered groups of pine, you look upon one hundred and fifty miles of the snowy range, from the Sangre de Cristo to the spurs away towards Laramie. In variety and harmony of form, in effect against the dark blue sky, in breadth

and grandeur, I know no *external* picture of the Alps which can be placed beside it. If you could take away the valley of the Rhone, and unite the Alps of Savoy with the Bernese Overland, you might obtain a tolerable idea of this view of the Rocky Mountains. Pike's Peak would then represent the Jungfrau; a nameless snowy giant in front of you, Monte Rosa; and Long's Peak, Mont Blanc. The altitudes very nearly correspond, and there is a certain similarity in the forms. The average height of the Rocky Mountains, however, surpasses that of the Alps."

On the Line of D. & R. G. Railway.

GRAND CAÑON OF THE ARKANSAS.

An English author, Wm. A. Baillie-Grohman, familiar with the Alpine scenery, says, in his "Camps in the Rockies," "Many of the Colorado mountains are called the Matterhorns of America — with about as much justification as the more diminutive Ben Nevis, or Snowdon, merits that name. With the Tetons, however, it is different; for it makes, so far as I know, the only and very brilliant exception to the usual dome-like formation of the Rockies. In shape it is very like the Swiss master-peak; but inasmuch as the Western rival rises in one majestic sweep of one thousand feet from the natural park, to an altitude all but the same (13,800 feet), I would, in this instance, in point of sublimity give the palm to the New World."

CAÑONS.

A cañon is a mighty gorge cut in the mountains by an irresistible torrent on its way to the sea. These wonderful chasms are numerous in the Rocky Mountains, some of them almost too grand to admit of description. Among the more widely known is "The Grand Cañon of the Arkansas," its name being derived from the Arkansas River, which rushes through it. The foregoing illustration furnishes a view of it at the entrance where the railroad enters.

On the Line of D. & R. G. Railway.

THE ROYAL GORGE.

This cañon is ten miles in length, the Royal Gorge, which is the narrowest and deepest point, extending but a fractional part of the distance. It is thirty feet wide at the gorge, with the walls rising perpendicularly on either side two thousand feet skyward, here and there a pinnacle shooting several hundred feet higher. The scene is weird, solemn, and awful, totally unlike anything which we ever dreamed of. Merriment is out of place there; no observer is inclined to joke as he looks up at the mountain crevice in which he seems confined. The rocky

sides two thousand feet high! Set ten Bunker Hill Monuments one upon another, and the distance is barely covered!

Several gentlemen viewed the Royal Gorge from the summit before any one dreamed of running a railway through it. One of the number — a clergyman — said to the writer: "We knew that it was an awful place, for friends had been there before us, and rolled large stones over the precipice, to listen to their reverberating sound as they descended, down, down, down, their noise dying away in the distance. We had a strong desire to look down into the awful gorge from the top, so we crawled on our hands and feet to the dizzy edge, not daring to trust ourselves in an upright position, and cast one swift glance down into the terrible chasm; and that was enough. The transient view was a shock to our nerves. We crawled back as quickly as possible to a place of safety, and from that day to this, I never had the least desire to repeat the act. Though seven years have elapsed, as often as memory recalls the scene, I feel a weakness and shudder running through my body."

The "Black Cañon" is a darker and more dismal gorge, lying west of Gunnison City. Its name is derived from the dark, sombre appearance of the walls, although in some places they are composed of red sandstone. But a profusion of cedars and pines grow near the summits and out of crevices which the elements have made down the sides; and these cast a gloom over the place, creating a sensation of loneliness in the hearts of many observers. There is great variety of scenery in this cañon, and one never tires of looking. Here and there small rivulets are seen issuing from the craggy sides, two thousand feet up and more, while occasionally a beautiful cascade leaps over its rocky bed to break in pieces on the rocks below; and, in one instance, a cataract leaps clear of every rock and plunges down the whole distance to the railway track. This cañon is thirty miles long, — three times the length of the Grand Cañon of the Arkansas.

The waterfall at the right is known as Chipeta Falls, and here the sides of the cañon rise from fifteen hundred to two thousand feet. From the railway the view is impressive. The cañon is unlike that of Arkansas in its general appearance, and yet like it in depth and some other characteristics. The contrast between the two is sufficient to create a lively interest in both, enough to dispel that false idea of the tourists, "when you have seen one cañon, you have seen all." Like "the human face divine," no two of them are alike, and hence each one must be studied by itself. We have entered them

at the bottom, middle, and top, and it is quite impossible to say at which point there is most to enjoy. At either altitude the impres-

On the Line of D. & R. G. Railway.

THE BLACK CAÑON.

sion can be described only by a series of exclamation points. "Webster's Great Unabridged" is mute on almost any cañon, and at almost

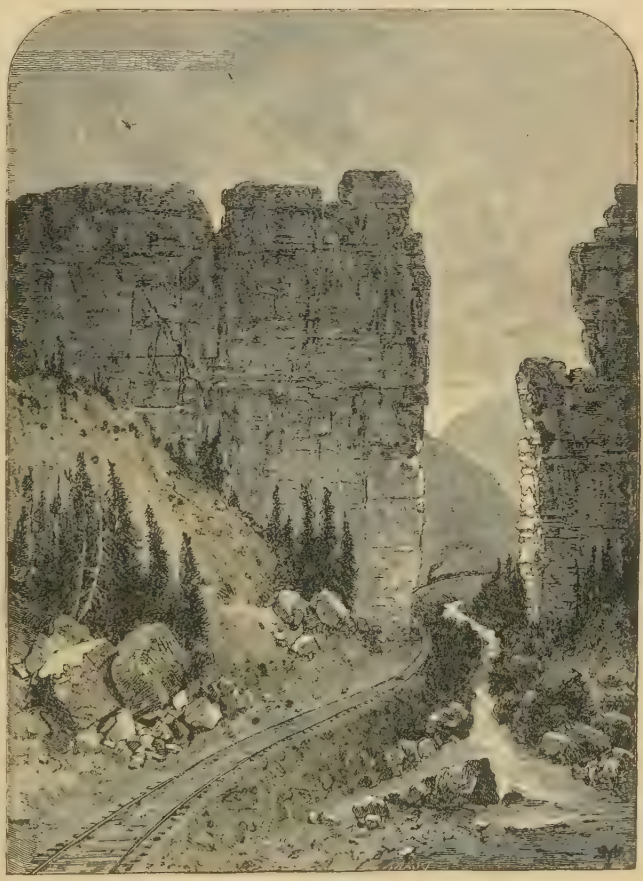
any point thereon. "Comparisons become odious" as never before; so that even the aspiring letter-writer feels somewhat insignificant

On the Line of D. & R. G. Railway.

CURRICANTI'S NEEDLE.

in his vain attempt at accurate description, and is inclined to say, "Lord, what is man that thou art mindful of him?"

Among the most remarkable objects in this cañon is "Curricanti's Needle," which towers above all other pinnacles. It stands as a sentinel to guard the everlasting solitude at its base. It is of a reddish color from top to bottom, and rises very abruptly into the air. A "Cleopatra Obelisk" does not possess more grace or symmetry than this natural wonder. Here and there a tree or shrub thrives in the crevices of its rocky sides. The cut is a fine and correct representation of the marvel.



On the Line of D. & R. G. Railway.

CASTLE GATE.

The author of "The Crest of the Continent" says of this marvel: "In the very centre of the cañon, where its bulwarks are most lofty and precipitous, unbroken cliffs rising two thousand feet without a break, and shadowed by overhanging cornices — just here stands the most striking buttress and pinnacle of them all, — CURRICANTI'S NEEDLE. It is a conical tower standing out somewhat beyond the line of the wall, from which it is separated (so that from some points of view it looks wholly isolate) on one side by a deep gash, and on the other by one of those narrow side-cañons which in the western part of the gorge occur every mile or two. These ravines are filled with trees, and make a green setting for this massive

monolith of pink stone, whose diminishing apex ends in a leaning spire that seems to trace its march upon the sweeping clouds."

As our limits will not allow of an illustration or description of the Price River Cañon, lying beyond on the route to Salt Lake City, we will call attention to its marvellous gateway, called "Castle Gate," through which river, railway, and trail pass.

It strikingly resembles the "Gateway to the Garden of the Gods." "The two huge pillars or ledges of rock composing it, are offshoots of the cliffs behind. They are of different heights, one measuring five hundred, and the other four hundred and fifty feet, from top to base. They are richly dyed with red, and the firs and pines growing about them, but reaching only to their lower strata, render this color more noticeable and beautiful. Between the two sharp promontories, which are separated only by a narrow space, the river and the railway both run, one pressing closely against the other. The stream leaps over a rocky bed, and its banks are lined with tangled brush. Once past the gate, and looking back, the bold headlands forming it have a new and more attractive beauty. They are higher and more massive, it seems, than when we were in their shadow. Church-like caps hang far over the perpendicular faces. No other pinnacles approach them in size and majesty. They are landmarks up and down the cañon, their lofty tops catching the eye before their bases are discovered. It was down Price River Cañon, and past Castle Gate, that General Sydney Johnson marched his army home from Utah."

RIFT IN THE ROCKS.

Twenty miles from Denver is the entrance to PLATTE CAÑON, which is scarcely inferior to the Arkansas Cañon in the variety and grandeur of its scenery.

The walls at the entrance are several hundred feet high, increasing in altitude as the mountain is penetrated. Peak on peak greet the eye, shooting up higher and higher, as the train begins to climb the sides of the mountains. The tourist has heard that the

Rocky Mountains are distinguished for the number of peaks, and now he has ocular demonstration of it. With a single sweep of his vision he can count thirty, forty, and even sixty peaks, piled one above another, clear back to the sky.

Personal observation alone can enable one to realize the crookedness of the cañon. It is necessarily crooked beyond all ordinary conception of crookedness ; so that crookedness becomes one of the grand novelties to enjoy. We venture to affirm that the traditionary stick that was so crooked it couldn't lie still, was not so crooked as this cañon.

The eye is frequently delighted by such scenes as the cut on the previous page illustrates, the monumental stones or spires often numbering a half-dozen in the cluster.

A writer who is perfectly familiar with this cañon says : "For full fifty miles there is a succession of complex curves, and beetling heights coming almost together above and crowding the track from one side to the other. Nature has shaped the rocks so oddly that giants seemingly stand guard by their castles perched dizzily above, but scorning to molest the rabble going uninvited through their possessions. It is a fascinating sight to watch the engine, which writhes along as though its gleaming fire were an inward life, its puffs a pulse, and the sparks flying crimson against the walls, drops of agony. At times the cliff is directly ahead. Unwittingly you brace for the shock to come when the cars shall be dashed to pieces against its flinty face. But with a quick turn to the right or left, the passage by is made in safety. The train hurries by picturesque hamlets, among which Estabrook Park is perhaps the most delightful, and up Kenosha Hill by a miracle of engineering, and from the top you behold such a panorama as was never seen before from the windows of a railway coach."

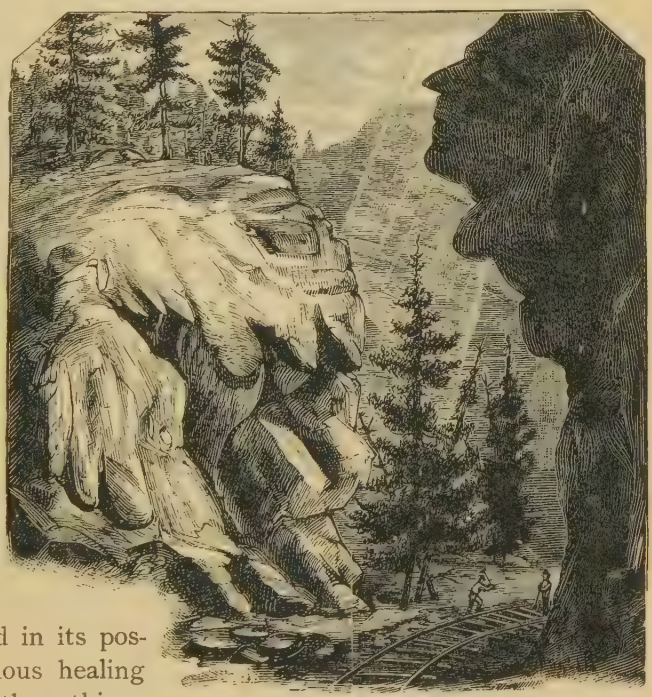
Boulder Cañon, in which Dome Rock is found, is sixteen miles in length, wild and grand. A tourist (H. H.) says : "To see Boulder Cañon aright, one must enter it from the Nederlands Meadows, at its upper mouth ; and to reach the Nederlands Meadows from Denver, one must go by rail to the Clear Creek Cañon, and drive across from Central City to Nederlands. The road lies through tracts of pines and over great ridges, grand in their loneliness. From every ridge is a new view of the 'Snowy Range' to the west and north. In strong sunlight and shadow, these myriads of snow peaks, relieved against the blue sky, are of such brilliant and changing colors that it must be a very dull soul indeed that could look on

them without thinking of many-colored jewels. On the day that I saw this view, James' Peak was covered with snow, and stood in full light. Its sharp, pyramidal lines looked as fine cut and hard as if the mountains had but just been hewn from alabaster."

CLEAR CREEK CAÑON deserves mention with the remarkable cañons already named. Mr. Fossett says: "The most entertaining trip that can be made, and the quickest and cheapest, is that by way of the Colorado Central Railway from Denver to the mining cities of Central, Black Hawk, Idaho, and Georgetown. In this the tourist gets the greatest variety for the least expenditure of money that any single excursion affords which actually enters the mountains any distance. While Clear Creek Cañon [through which the aforesaid cities are reached] may not compare with the Royal Gorge in massive grandeur, the tourist can derive unalloyed pleasure from the many and varied sights that continually offer themselves *en route* and at adjacent points on either hand."

DOME ROCK.

This cañon is twenty miles from Denver, and was the first ever penetrated by a railway. At the entrance, the walls rise about one thousand feet, so near together that a child can throw a stone from one side to the other. It is exceedingly tortuous, jagged, and grand. The rocky walls often rise to two thousand feet, and even to twenty-five hundred feet, in sublime proportions, and nature has carved them into many fantastic forms. Henry James, Esq., says: "At times the cañon widens, but again it comes together like two mighty jaws. Some marvellous turns are made, until in confusion you wonder which way you are going, and if such a series of doubling back will not ultimately lead to the starting-point." He continues: "For the miles of amazing, overpowering height of cliffs, and their near approach to or absolute verticality; for majestic, awe-inspiring grandeur of projecting masses along the mighty walls, and the domes of bare gray or brown granite that tower above, combined with the peaceful, indeed exquisite, beauty of the floor of its upper valley so many thousand feet below the surrounding silvery summits, as well as for the majesty of the forests of pine and spruce that clothe the mountains as far as the eye can reach; and for the absorbing interest of vast gold and silver mining enterprises lining it for miles at a stretch, and in its possession of delicious healing waters,—for all these things Clear Creek stands unequalled by any cañon penetrated by a railway on the whole earth. An hour's ride from Denver, over the Colorado Division of the



THE DOUBLE HEAD.

Union Pacific, takes the tourist fairly into it, and for forty miles he is afforded a spectacle of surpassing splendor."

The Double Head is a hanging rock as well as a double head, located in a very picturesque part of the cañon. Double-faced humans are more common in flesh than they are in stone, because they are more easily wrought in soft material, we suppose. Hence, they are more remarkable in stone. Let the reader study the illustration thoughtfully, and his wonder over such natural phenomena will increase.

THE OLD MAN OF THE MOUNTAINS.

That the above bit of sculpture was well named by miner or tourist, the reader must admit. The features of the "old man" stand out in bold relief, even to the left ear. There have been other "old man of the mountains" in different parts of our country, — one of them in New England, — but none of them can compare with this in

striking resemblance. The venerable patriarch can add to his novelty by laying claim to the fact that he was settled here before Columbus landed on these shores.

GRAY'S PEAK.

It is through Clear Creek Cañon that Georgetown is reached, from which place parties easily ascend to the summit of Gray's Peak, which is two hundred feet higher than Pike's Peak. Gray's is 14,341 feet above the level of the sea — the highest mountain peak in the United States except Blanca. Here is the "dome of the continent," as all who ascend to the top of Gray's Peak fully realize, when, in a clear

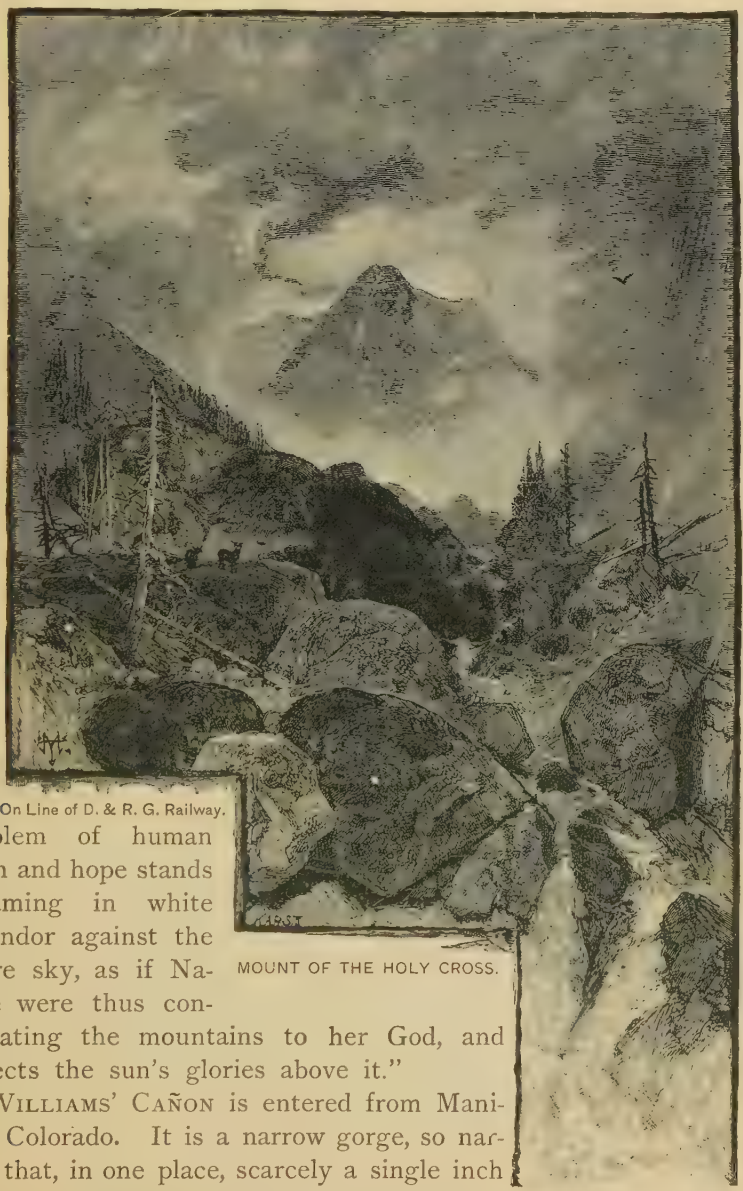
day, they take in the magnificent view of two hundred miles and more in every direction.

Henry James, Esq., describes the view from Gray's Peak most graphically. "A wavering line," he says, "stretches back to the valley, and the tourist wonders vaguely if he has just come over it. The horse is panting as he takes the last turn, and his shoes click upon the granite jewels of the continental crown. Gray's Peak is beneath you. The sea is 14,411 feet below your level. Hats off! The genius of this sublime solitude demands homage. They who have traversed the globe say that it affords but one such prospect. A pictured landscape so mighty in conception that it overpowers, yet harmonious as an anthem in all its infinite diffusion of color and form; framed only by the limit of the eye's vision; a picture where the lakes gleam and the rivers flow, the trees nod, and the cloud ships clash in misty collision with the peaks which have invaded their realm, while the moving sun floods it with real life and warmth. How like an atom the beholder feels! Northward, southward, westward, ramify the spurs of the range, till remoteness swallows them up. Pike's Peak is a neighbor. Lincoln's and Long's seem near. The sharpness of the Spanish peaks — Terra's Twins — near New Mexico, is distinct, while the Uintah Mountains rise up faintly in the distance of Utah. Here and there are depressions where parks and valleys are. Every park in the State can be located. You may trace the course of rivers and the site of lakes. You can see the little cities in sheltering nooks, and pathways from them up the mountain side. You detect the glint of the Holy Cross. You perceive the South Park Railway worming along the valley of the Blue. You overlook Decatur and Dillon and Chihuahua. You note the hovering dusk which broods above Leadville. Eastward are the plains — a waterless ocean — each town a fleet, each house a sail, each grove an island. Denver is seen, like the mythical city of the mirage."

Close observation of the cut will show Mr. James to the reader, on his way to the summit.

The writer whose description of the view from Gray's Peak we quoted referred to the "Mount of the Holy Cross." It is not a fancy picture — it is a real mountain, rightly named, situated in the vicinity of Leadville and Red Cliff. "The sacred symbol which gives the name to the 'Mount of the Holy Cross' is derived from two great and deep depressions, one vertical, and one horizontal, which cross each other nearly at right angles on the bare eastern slope of the mountain, which in winter become filled with great

masses of snow. During the summer the snows around these depressions are melted away, leaving the rest naked, and the snowy



On Line of D. & R. G. Railway.

MOUNT OF THE HOLY CROSS.

emblem of human faith and hope stands gleaming in white splendor against the azure sky, as if Nature were thus consecrating the mountains to her God, and reflects the sun's glories above it."

WILLIAMS' CAÑON is entered from Manitou, Colorado. It is a narrow gorge, so narrow that, in one place, scarcely a single inch of space separates the carriage from the walls on either side. The tortuous road winds itself through scenery as grand as it is versatile. Tall cliffs and monumental piles of rock

WILLIAMS' CAÑON.

rise, one upon another, in wonderful profusion, "worn by some fierce torrents of long ago, until now they show on their steep façades the deep scars which whirling rocks have formed."

"RAINBOW FALLS" is a very beautiful cascade, in one of the most romantic parts of the wild Ute Pass. Its name is derived from the fact that, at a certain time of day, when the sun reaches a given meridian, a perfect rainbow appears on the sheet of falling water.

On the Line of D. & R. G. Railway.

RAINBOW FALLS.

Two miles up the cañon is the "Cave of the Winds" (p. 21), a remarkable subterranean cavern in which a hundred chambers have been explored, some of them very high and long. In these chambers are countless stalactites and stalagmites, which glisten in the light of torches which explorers carry, presenting a dazzling and fairy-like appearance.

Cave of the Winds is a great curiosity to all tourists, and they put themselves to great inconvenience in order to see it. It is wild in itself, and everything around it is wild also. A party on their way thither were overtaken by a tempest in the mountains, and one of the number acquaints us with the scene as follows:—

"Once, in a ramble to the Cave of the Winds, we were weather-bound for an hour in a lime-burner's hut by the side of the trail, while a furious hail-storm rolled through the cañon, and five minutes after the majestic columns in the Temple of Isis, a thousand feet above our heads, were blazing and glowing as if under some reflected shower of sunshine. The flying clouds lifted here and there from peaks and battlements; the inspired air tingled in every vein; the heavenly glow and radiance flashed into our souls; and ten minutes after we were in the midst of another swift storm of hail, or snow, or rain, as if sunshine never belonged to the world. . . . It was not unusual, through these days, to have four alternate storms in the course of a single hour, with clear skies between; but owing to the brilliant rarity of the air, we were never sure it was raining until we felt or actually saw it. And this when it was pouring a ton to the square inch."

"How the giant element
From rock to rock, leaps with delirious bound!"

A very remarkable locality in Clear Creek Cañon, near Georgetown, has been named "Devil's Gate." It is spanned by a railroad bridge at a dizzy height, from which tourists enjoy a very enchanting

On the Line of U. P. Railroad.

DEVIL'S GATE.

view The strange wildness of the scenery, a mixture of jaggedness, confusion, and desolation, suggest badness, and hence the bad name.

Castle Rock is a huge formation, so much like an old feudal castle as to suggest its present name. An arch underneath, like an ample doorway, renders it a more curious and notable object. Water, no doubt, that powerful agent of nature, imprisoned within, found this the most feasible way of getting out, and hence the arch. Mythology would not be troubled to find here an abode of the gods, whose presence once converted cave, dell, rock, ravine, and mountain peak and gorge into strange thrilling history.

Another curiosity in this cañon is the "Pillar of Jupiter," — so named by tourists, — a mammoth rock, or ledge, worn by the elements into its present imposing appearance.

CAVE OF THE WINDS.

The pedestal on which nature has erected this statue is so distinct that the statue itself becomes more striking. It is a curious production, or freak of nature, as some would call it, contributing another object of interest to the great variety which everywhere keeps the vision lively.

Dr. Taylor writes of Pike's Peak, as seen from Denver, as follows: "To the southwest, Pike's Peak, the mighty milestone and monument to thousands of the old miners, stands erect and flat-footed upon the world. It is seventy-five miles to its base, but the view is as clean-cut as a cameo. Should I tell anybody it is 13,985 feet high, it would be no very satisfactory information; should I say, you must climb about twelve miles to reach the summit, it would be better; but suppose the reader swings a little water over a fire on the sea-

CASTLE ROCK.

beach, metonymically, it will boil at 212°. Now pick up kettle, kindling-wood, and thermometer, and begin your climb. At fifty-three hundred feet the water is in active trouble at 202°. Playing Longfellow's young man, Excelsior, again, at the altitude of 10,600 feet it is in a lively state of unrest at 192°. Another lift to the top of the Peak, and the peripatetic kettle makes a tambourine of the lid, and plays so mild a tune that what scalded you so promptly and satisfactorily down by the sea, will be no hotter than the tea strong enough to "bear up an egg," wherewith our grandmothers clinked up their hearts and limbered their tongues after a big washing. How often lofty people forget that ebullition does not always mean earnestness and fervor. Boiling water is not necessarily hot water."

PILLAR OF JUPITER.

"Ute Pass" is the world-renowned wagon trail from Manitou to Leadville, a narrow defile leading over the mountains in a circuitous way. It was originally an Indian trail over which the red men travelled to and from the Manitou Valley. When gold was discovered at

Leadville, and the rush for that Eldorado fairly set in, this trail was converted into a passable road, at an expense of $15,000, over which the immense supplies were carried to that most famous of all mining

FREIGHT TEAMS CLIMBING UTE PASS.

towns, Colorado City being headquarters for supplies. Two thousand horses and mules were employed to convey the necessaries of life over the "Pass" to that rapidly growing population, and

still there was privation, and even suffering, among the gold-seekers because of scant supplies. As soon, however, as rail communication with the place was established, the quantity and price of goods found their proper level. Twenty-five cents a pound for hay was a common price when it was carried over the pass, but the railroad reduced it at once to three, and even less. The illustration also furnishes a good view of Rainbow Falls.

On the Line of D. & R. G. Railway.

MANITOU AND PIKE'S PEAK.

Another says of Ute Pass: "The oftener one goes through this pass, the grander it seems. There are in it no mere semblances, no delusions of atmospheric effect. It is as severely, sternly real as Gibraltar. Sunlight cannot soften it nor storms make it more frowning. High, rocky, inaccessible, its walls tower and wind and seem at every turn to close rather than to open the path through which the merry little stream comes leaping, foaming down. . . .

For a short distance the road is narrow and perilous — on strips of ledges between two precipices, or on stony rims of the crowded brook, which it crosses and recrosses twenty-four times in less than three miles. Then the Pass widens, the rocky walls sink gradually,

round and expand into lovely hills — hill after hill bearing more and more off to the right and more and more off to the left — until there is room for bits of meadow along the brook and for groves and grassy intervals where the hills join; room and at the same time shelter, for the hills are still high. . . .

We came out at sunset on a ridge from which we could look down into a meadow. The ridge sloped down to the meadow through a gateway made by two huge masses of rocks. All alone in the smooth grassy forest they loomed up in the dim light, stately and straight as colossal monoliths, though they were in reality composed of rounded bowlders piled one above another."

Pike's Peak was named in honor of Gen. Z. M. Pike, who discovered it in 1806. The ascent is wearisome and somewhat perilous, passing, as the trail does, over rugged hills and the precipitous walls of narrow cañons. The ascent is made from Manitou, which nestles at its base, as indicated by the cut. The transition is very abrupt from a dense pine forest to the bare, bald, storm-beaten mountain side where no vegetation appears, except grass here and there in patches among the rocks. The summit is nearly level, embracing about sixty acres. Near it appears a faint yellow blossom mingled with purple, often in great profusion, so near to the snow that blossoms may be plucked with one hand and snow with the other. Two mighty gorges extend from the top almost to the base, one of which can be seen at the distance of eighty miles.

"Pike's Peak" was the watchword of the gold-seekers in 1859, who flocked by thousands and tens of thousands to the region which that famous landmark overlooked. The next year the product of the mines, within the Pike's Peak district, amounted to four million dollars. In August, 1860, the population was sixty thousand; and, two months later, nearly two million dollars were invested in quartz-mills, — a fact which shows the rapidity of settlement.

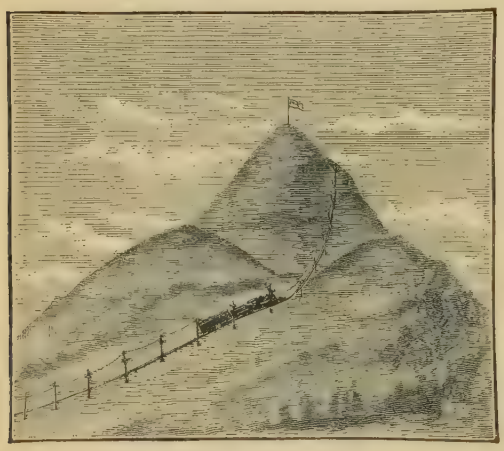
The view of Pike's Peak from Manitou is exceedingly impressive. The town is about six thousand feet above the sea level, but the mountain rises more than eight thousand feet above it in unparalleled grandeur. Lesser peaks surround it in magnificent proportions, and magnify, by contrast, the majesty of their towering monarch.

Private enterprise has completed a cog-wheel railway to the top of the peak, where the United States Signal Service has a station. The following cut illustrates the method of ascending the peak by this railway, running less than nine miles to ascend two; whereas, the original plan required thirty miles of track to make the ascent.

The Pike's Peak Railway is the most notable piece of track in the world. It ascends two thousand feet higher than the Lima and Oroya Railway in Peru. The average ascent per mile is one thousand three hundred and twenty feet. The total ascent from base to summit is seven thousand five hundred and twenty-five feet.

Cheyenne Cañon is situated three miles from Colorado Springs, and possesses many grand features. We shall occupy space only to call attention to the one marvellous object that makes it famous, — The Seven Falls.

One who has often penetrated this cañon to gaze enraptured upon its wonderful Seven Falls, says: "In Cheyenne Cañon, at its extreme end, a volume of water dashes over a dizzy height, and, leaping from ledge to ledge, reaches its granite basin, and lingers there awhile to recover from its fall before speeding on again toward the river leading across the plains to the distant sea. This cañon, only three miles from town, is entered after climbing to the top of a sloping mesa, which commands a view of the city and plains. A narrow path penetrates the mountains, and leads through a luxuriant growth of trees to where stern, rocky, vari-colored heights press their huge shoulders into the narrow way, and render climbing necessary for those who would go still deeper into the solitudes of the Rockies. Tall trees, uprooted by the madly rushing stream which flows through the cañon, and thrown down by the fierce winds, which, at some time, have swept through the narrow gorge, lie across the path in wild disorder. There is a balmy fragrance in the air; a low rumble fills the place as the water leaps over the fallen bowlders which beset its path; there are ever-varying shades; and now and then a glimpse is had beyond the cañon's mouth, of the plains, which are lighted by the sunlight, while the gorge is dark and cold."



PIKE'S PEAK RAILWAY.

Echo Cañon is entered by the Union Pacific Railway at Castle

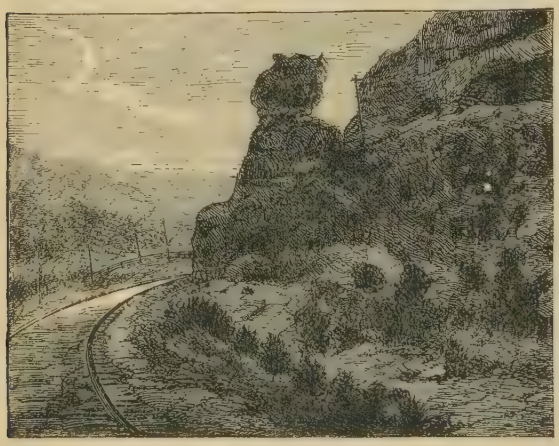
Rock in the Wasatch Mountains, Utah. It embraces some of the wildest and most majestic scenery of the New West, together with several of the most original and interesting objects which nature ever carved. These begin at the very mouth of the cañon, as the cut on the following page shows.

Nature builds on a magnificent scale at the West, and so her rock-pulpit, at the opening of Echo Cañon, is none of your modern toy affairs behind which an orator can hide all but his head. It is made to stand upon, though towering high into the air; and the imaginary preacher occupying it is supposed to address the multitude who pass down the cañon by generations. It is a fitting introduction to the scenes that follow.

THE SEVEN FALLS.

Mr. Crofutt says: "The beauties of

Echo Cañon are so many, so majestic, so awe-inspiring in their sublimity, that there is little use in calling the traveller's attention to them. . . . Four miles below Hanging Rock the walls rise in massive majesty, the prominent features of the cañon. Rain, wind, and time have combined to destroy them, but in vain. Centuries have come and gone since that mighty convulsion shook the earth to its centre, when Echo and Weber cañons sprung into existence, — twin children, whose birth was heralded by throes such as the earth may never feel again; and still the mighty wall of Echo remains, bidding defiance alike to time and his co-laborers, the elements; still hangs the delicate fret and frost work from the walls; still the pillar, column, dome, and spire stand boldly forth in all their grand, wild, and weird beauty to entrance the traveller, and fill his mind with wonder and awe."[1]



PULPIT ROCK.

Another says: "A cañon is only a valley between the high hills; that is all, though the word seems such a loud and compound mystery of warfare, both carnal and spiritual. But when the valley is thousands of feet deep, and so narrow that a river can barely make its way through by shrinking and twisting and leaping; when one wall is a mountain of grassy slope, and the other wall is a mountain of straight, sharp stone; when from a perilous road, which creeps along on ledges of the wall which is a mountain of stone, one looks across to the wall which is grassy slope, and down at the silver line of twisting, turning, leaping river, — the word cañon seems as inadequate as the milder word valley. This was Echo Cañon. We drew near it through rocky fields almost as grand as the cañon itself. Rocks of red and pale yellow color were piled and strewn on either hand in confusion so wild that it was majestic; many of them looked like gateways and walls and battlements of fortifications; many of

[1] Crofutt's Overland Tourist is indispensable to the traveller. It contributes information, direction, and interest to his travels.

them seemed poised on points, just ready to fall. Others rose, massive and solid, from terraces which stretched away beyond our sight. . . . Then the cañon walls close in again, and looking down, we see

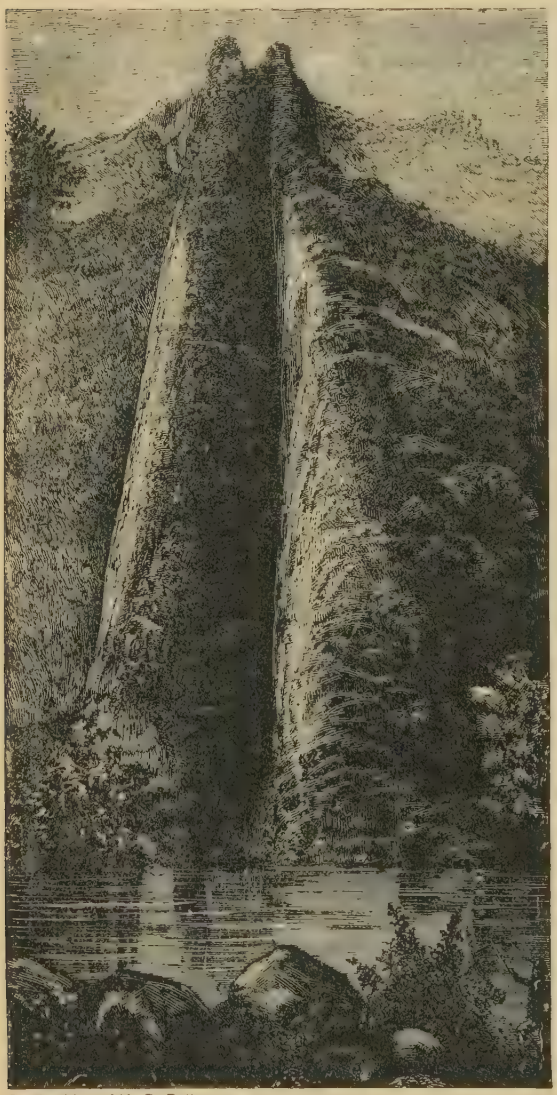
On the Line of U. P Railway.

HANGING ROCK.

only a silver thread of river; looking up, we see only a blue belt of sky. Suddenly we turn a sharp corner and come out on a broad plain. The cañon walls have opened like arms, and they hold a town named after their own voices, Echo City. The arms are mighty, for

they are snow-capped mountains. The plain is green and the river is still."

The preceding cut represents a remarkable hanging rock, of which there are several in the Rocky Mountain region. This is the most famous of them all, and it is located in the wildest part of Echo Cañon. The cañon is so crooked for nearly thirty miles before reaching this rock, that the railway crosses the creek thirty-one times in twenty-six miles.



On the Line of U. P. Railway.

DEVIL'S SLIDE.

Eight miles from Echo City the rocks just described are lost sight of, and others of different form, larger and grander, are substituted. The cañon also becomes wilder and more inaccessible, requiring tunnels to be cut in order to surmount serious difficulties. Here a tunnel, five hundred and fifty feet through a solid rock, is cut, and a little further on, another of less importance. Near the entrance of the first tunnel formerly stood Finger Rock. Time and the elements have broken it away, but its remarkable appearance is still remembered distinctly by those who were so fortunate as to behold it in its original symmetry.

Devil's Slide is a very singular figure, and is an object of great interest to tourists. It is serrated rocks. This slide is composed of two ridges of granite rock, reaching from the river nearly to the summit of a sloping, grass-clad mountain. They are from fifty to two hundred feet high, narrow slabs, standing on edge, as though forced out of the mountain side. The two ridges run parallel with each other, about ten feet apart, the space between them covered with grass, wild flowers, and climbing vines.

If nature had intended to provide a curiosity for travellers of the nineteenth century, when human enterprise would tunnel and remove mountains, she could not have been more successful. The action of the elements has produced many remarkable natural phenomena, here and elsewhere, but few more interesting than this. We do not wonder that wind and water have been ages in excavating this mighty gorge, with so much carving on its adamantine walls. Water can easily percolate through mountain ranges, and finally plunge in torrents down weird ravines, plowing deeper and deeper, overturning, defacing, and destroying in its mad, onward rush: but TO SCULPTURE as it goes — that is not so easy. Nevertheless, here and elsewhere, the elements have wrought better than they knew; and now tourists find pleasure in these art galleries of nature.

Pulpit Rock is not a single shaft of granite, but is composed of several stones laid one upon another. It would be of little interest, of course, were it a huge pile erected by human strength and skill; for then it would not be wonderful at all. It is because human plan and effort had nothing to do with its formation that it awakens interest. It is such objects as this which make a trip over the Union Pacific Railroad a great novelty.

The "American Fork Cañon" of Utah is grand, though devoid of the gorgeous coloring of Echo and Weber cañons. The walls at the entrance are not more than a hundred feet apart, and the peaks six hundred feet high. But the walls rise rapidly until they are twenty-five hundred feet above the road-bed. The traveller experiences a peculiar sensation at times from the appearance of the walls coming together just in advance of him, and shutting him in, so narrow is the gorge. Let the reader imagine himself in this crevice of the Rockies, if he can, with the walls towering above him eight times as high as the tallest of the big trees in the Yosemite Valley; and he can form some idea of the impressiveness of the scene. Eight of the tallest trees from the Mariposa grove, one set upon another, only cover the distance from the bed of the cañon to the tallest peaks above on

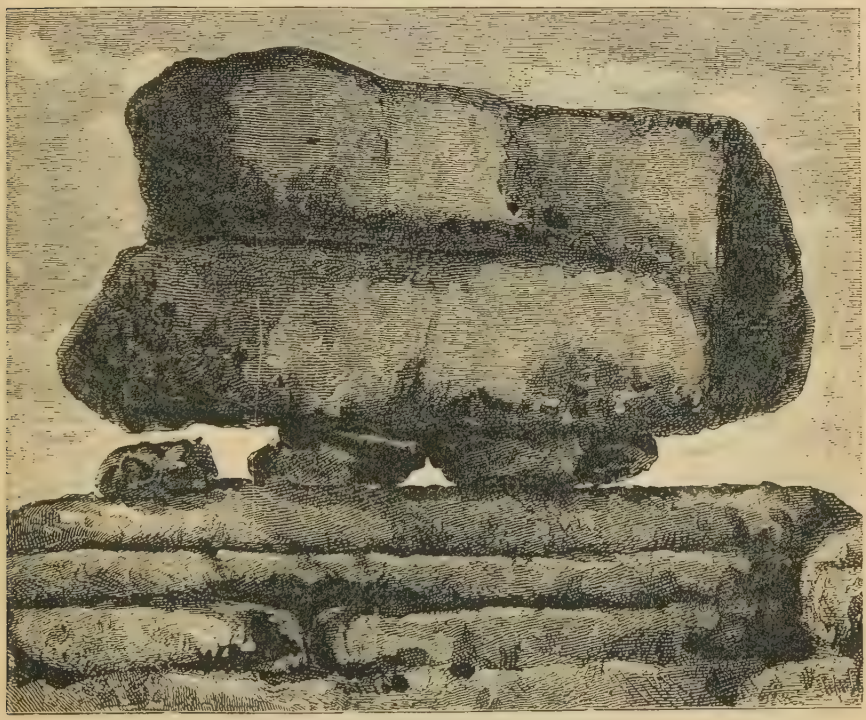
either side! Mr. Crofutt puts the matter finely when he says: "Imagine, then, this cañon with its grottos, amphitheatres, and its towering crags, peaks, and needle-pointed rocks, towering *far* above the road, overhanging it in places, with patches of eternal snow in the gloomy gorges near the summit, and clothed at all times in a mantle of green, the pine, spruce, and cedar trees growing in all the nooks and gulches and away up on the summit; then countless mosses and ferns clinging to each crevice and seam where a foothold can be secured, together with the millions of flowers of every hue; where the sun's rays are sifted through countless objects on their way to the silvery, sparkling stream below, with its miniature cascades and eddies. We say imagine all these things, and then you will only have a faint outline of the wild and romantic, picturesque and glorious American Fork Cañon." "Lion Rock," "Telescope Peak," "Sled-runner Curve," "Rainbow Cliff," and "Hanging Rock" are among the objects of peculiar interest in this cañon.

On the Line of U. P. Railway.

PULPIT ROCK.

It requires no stretch of the imagination, in passing through a

cañon like this, to behold castles, pyramids, obelisks, towers, colonnades, and every sort of architecture in the marvellous rock-formations that appear on every side. Bayard Taylor said of the view in another locality of the "Rockies": "Here was a feudal castle of the Middle Ages; there a shattered, irregular obelisk, or broken pyramid; and finally, rising above from the level of a meadow, we beheld three perpendicular towers, eighty feet high, resting on a common base. Their crests were of bright orange hue, fading downward into white. Beyond them extended the shattered battlements of a city



On the Line of U. P. Railway.

HIPPOPOTAMUS ROCK (Near Sherman).

sparkling in the sunshine." The principal part of this description will apply to hundreds of localities within cañons and without.

The name of the above rock is derived from its form, which is singular indeed. The more we study it, the more remarkable it appears. The foundation even is as remarkable as the rock itself, when we stop to reflect that it was laid by nature, and not by man. It is a huge affair; and here it has stood for ages, probably, in just this

position. If it were thrown into this position by some convulsion of nature, so much the more mysterious must be its history; for then an earthquake must have order in its madness. Evidently the real life of this rock would contain a wonderful chapter of nature's effort to heave the Rocky Mountain region into its present status.

CLIMBING THE GRAND CAÑON OF THE COLORADO.

We shall not even call attention to many cañons, but close our special attention to them by a description of the greatest cañon of all, — "THE GRAND CAÑON OF THE COLORADO," with several of its side cañons. This is the most marvellous cañon of the world, its name being derived from the river which runs through it. It is situated in Arizona, and is nearly three hundred miles in length.

The United States Government explored Colorado River and cañons, from 1869 to 1872, doing the work thoroughly, under the lead of Captain (now Major) J. W. Powell. Powell and his men were the first human beings who ever passed through the whole length of the cañons — a thousand miles. It was a remarkable exploit, to accomplish which they actually took their lives into their hands, and made a stake of everything. Once on their way, return was impossible: they must proceed or perish.

They commenced their hazardous undertaking by entering the first cañon, on the northern boundary of the State of Colorado. The river was rapid and turbulent, taxing the skill and judgment of the party to keep their light boats right side up. Week after week and month after month they pursued their perilous way down the river, through tortuous gorges, hemmed in by walls on either side, often four, five, and six thousand feet high, not knowing but that each day would be their last.

In 1854 two men, White and Strobe, were seeking gold in South-eastern Utah, where they were attacked by Indians. They took refuge in one of the uppermost cañons of the river, where, upon reflection, they saw their only way of escape was down the river. To return would be sure death, as the Indians would show them no mercy. Constructing a rude raft with such wood as they could find, they started down the river. The fourth day their raft upset as they were descending rapids, and Strobe was drowned. White clung to the raft, and succeeded in righting it; and he continued his journey alone, rapids and whirlpools frequently imperilling his life. In ten days he reached a small Mexican settlement of a dozen poor adobe huts, and he was safe. He escaped from the Indians of Utah, however, only to be killed by other Indians the following year.

In 1855 a party of several men, led by one Ashley, made a similar attempt, and they were soon wrecked, and all but Ashley and one companion drowned. Major Powell discovered the remains of that wreck, and honored their brave leader by naming the spot Ashley Falls. Such facts show that Powell and his exploring party undertook a very perilous work for their country.

By actual measurement, the walls at the highest point of the cañon are SIX THOUSAND TWO HUNDRED FEET! It is difficult for the reader to appreciate the depth of this cañon. Perhaps the writer can assist him to take it in. Imagine yourself at the bottom of the chasm, looking upwards. It is six thousand two hundred feet to the edge of the precipice above. A very tall church-spire, from the foundation, is two hundred feet, though very few pierce the air to that distance. *Thirty-one* church-spires of two hundred feet each, one upon another, will just cover the distance from bottom to top! Can your mind grasp and comprehend the grandeur of such a scene? Mountain-walls rising towards the sky more than six thousand feet, with crags and monumental piles, jagged rocks, and barren peaks, wildness, weirdness, and strangeness, uniting to make the abyss sublime and mysterious beyond description! "Who is like unto thee,

O Lord, among the gods? who is like thee, glorious in holiness, fearful in praises, doing wonders?"

What explorers call the "Grand Cañon District" embraces so many marvels that it is difficult to make a selection. However, we shall call attention to several which have been carefully photographed.

Buttes in the western portion of the Grand Cañon District are higher than those near Kanab; yet, in the latter region, they are from three hundred to six hundred feet high. "But," remarks Dutton, "what they lack in magnitude they make up in refinement and

PERMIAN BUTTE. (Near Kanab.)

beauty of detail, and in sumptuous color. It is in the Permian that we find the most remarkable buttes. They are never large, but their resemblance to human architecture, or works of design, are often amazing. Very few Permian buttes are found in the Grand Cañon District; but further eastward, especially in the neighborhood of the junction of the Grand and Green rivers, they are innumerable, and of such definiteness that the geologist feels as if he were taxing the credulity of his hearers when he asks them to believe that they are the works of nature alone, and not of some race of Titans."

The Vermilion cliffs derive their name from their color, which is flaming red. They extend more than one hundred and twenty miles,

and their height ranges from one thousand to more than two thousand feet. Captain Dutton remarks: "Their great altitude, the remarkable length of their line of frontage, the persistence with which their proportions are sustained throughout the entire interval, their ornate sculpture and rich coloring, might justify very exalted language of description. But to the southward, just where the desert surface dips downward beneath the horizon, are those supreme walls of the Grand Cañon, which we must hereafter behold, and vainly strive to describe; and however worthy of admiration the Vermilion Cliffs may be, we must be frugal of adjectives, lest, in the chapters to be written, we find their force and meaning exhausted. They will be weak and vapid enough at best. Yet there are portions of the Vermilion Cliffs which, in some respects, lay hold of the sensibilities with a force not much less overwhelming than the majesty of the Grand Cañon; not in the same way, not by virtue of the same elements of power and impressiveness, but in a way of their own, and by attributes of their own.

"The profile of Vermilion Cliffs consists of a series of vertical ledges rising tier above tier, story above story, with intervening slopes covered with talus, through which the beds project their fretted edges. . . . Near Short Creek it breaks into lofty truncated towers of great beauty and grandeur, with strongly emphasized vertical lines and decorations, suggestive of cathedral architecture on a colossal scale. Still loftier and more ornate become the structures as we approach the Virgen River. At length they reach the sublime. The altitudes increase until they approach two thousand feet above the plain. The wall is recessed with large amphitheatres, buttressed with huge spurs, and decorated with towers and pinnacles.

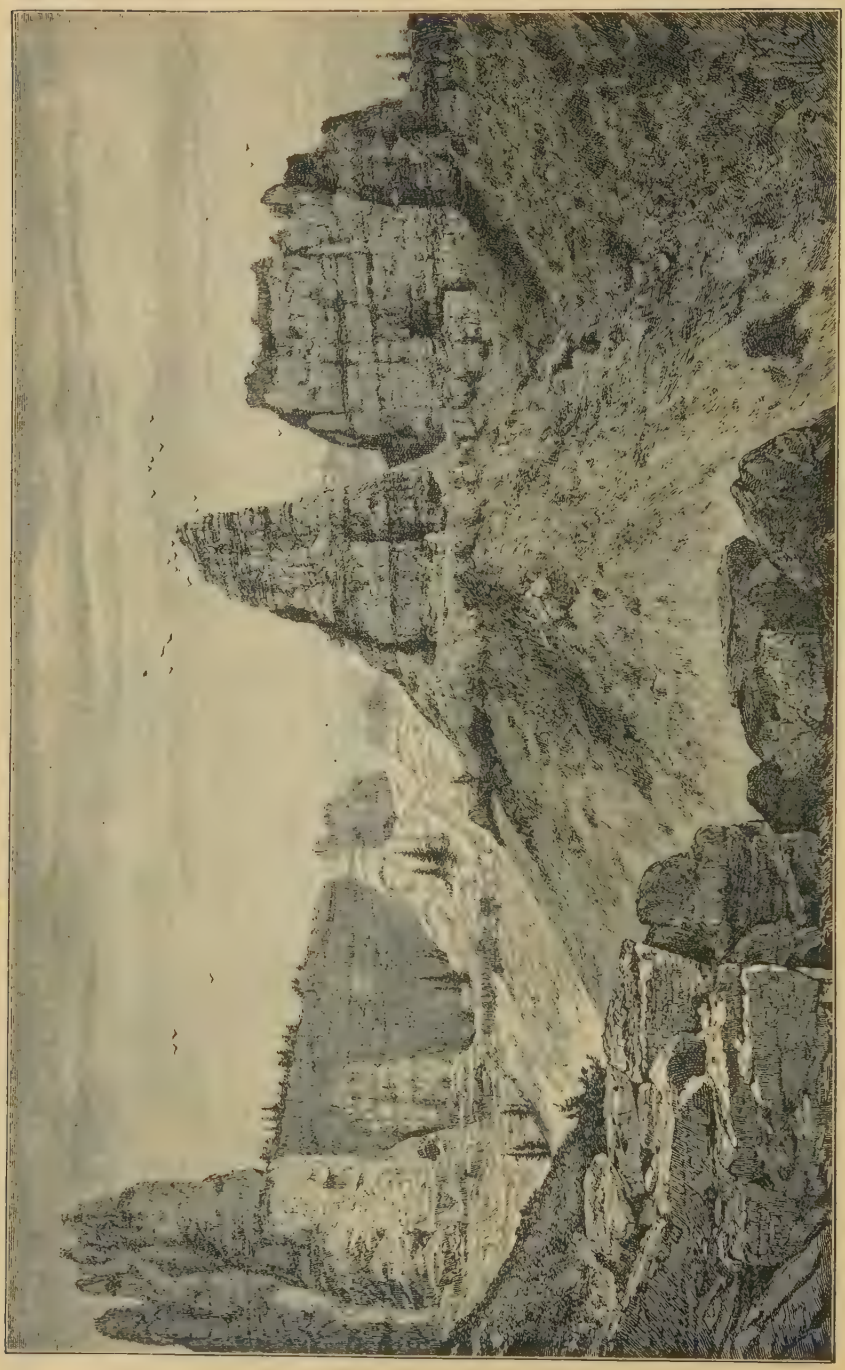
"As the sun is about to set, the cliffs glow with an orange-vermilion that seems to be an intrinsic lustre emanating from the rocks themselves. But the great gala days of the cliffs are those when sunshine and storm are waging an even battle; when the massive banks of clouds send their white diffuse light into the dark places, and tone down the intense glare of the direct rays; when they roll over the summits in stately procession, wrapping them in vigor, and revealing cloud-girt masses here and there through wide rifts. Then the truth appears, and all deceptions are exposed. Their real grandeur, their true forms, and a just sense of their relations are at last fairly presented, so that the mind can grasp them. And they are very grand — even sublime. There is no need, as we look upon them, of fancy to heighten the picture, nor of metaphor to present

VERMILION CLIFFS.

it. The simple truth is quite enough. I never before had a realizing sense of a cliff one thousand eight hundred to two thousand feet high. I think I have a definite and abiding one at present."

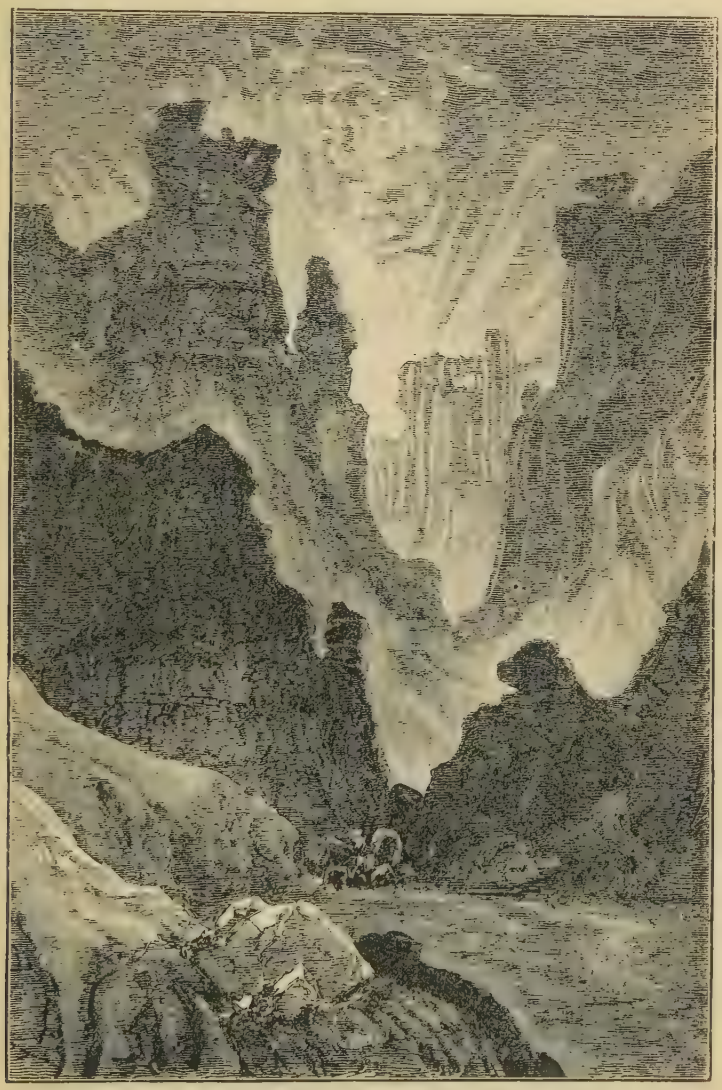
The Pink Cliffs present a marvellous scene even for the Grand Cañon District of the Colorado. The verge of the precipice at the foot of the cliff is eight hundred feet above the valley. From this eminence the cliffs rise in beauty and grandeur, to fill every observer with surprise and wonder. Captain Dutton says: "The cliff is of marvellous sculpture and color. The rains have carved out of it rows of square obelisks and pilasters of uniform pattern and dimensions, which decorate the front for many miles, giving the effect of a gigantic colonnade from which the entablature has been removed or has fallen in ruins. The Plateau Country abounds in these close resemblances of natural carving to human architecture, and nowhere are these more conspicuous or more perfect than in the scarps which terminate the summits of the Markágunt and Parmságunt Plateaus. Their color varies with the light and atmosphere. It is a pale red under ordinary lights, but as the sun sinks towards the horizon, it deepens into a rich rose color, which is seen in no other rocks, and is beautiful beyond description." The reader will understand whence the name given to the cliffs.

Dome and Towers is another view in the Grand Cañon District that baffles description. The Mu-kún-tu-weap, which is one of the principal forks of the Virgen, flows between mighty walls that are covered with the most remarkable natural carvings. Mr. Dutton says: "The further wall of the cañon, at the opening of the gateway, quickly flings northward at a right angle and becomes the eastern wall of Little Zion Valley. As it sweeps down the Parúnuweap (the other principal fork of the Virgen), it breaks into great pediments covered all over with the richest carving. The effect is much like that which the architect of the Milan Cathedral appears to have designed, though here it is vividly suggested rather than fully realized, as an artist painting in the 'broad style' suggests many things without actually drawing them. The sumptuous, bewildering, mazy effect is all there; but when we attempt to analyze it in detail, it eludes us. The flank of the wall receding up the Mukúntuweap is for a mile or two similarly decorated, but soon breaks into new forms much more impressive and wonderful. A row of towers half a mile high is quarried out of the palisade, and stands well advanced from its face. There is an eloquence in their forms which stirs the imagination with a singular power, and kindles in the mind of the dullest observer a glowing



PINK CLIFFS.

response. Just behind them, and rising a thousand feet higher, is the eastern temple, crowned with a cylindric dome of white sandstone; but since it is, in many respects, a repetition of the nearer



DOME AND TOWERS.

western temple, we may turn our attention to the latter. Directly in front of us a complex group of white towers, springing from a central pile, mounts upwards to the clouds. Out of their midst, and high over all, rises a dome-like mass, which dominates the entire landscape.

It is almost pure white, with brilliant streaks of carmine descending its vertical walls. At the summit it is truncated, and a flat tablet is laid upon the top, showing its edge of deep red. It is impossible to liken this object to any familiar shape, for it resembles none. Yet its shape is far from being indefinite; on the contrary, it has a definiteness and individuality which extort an exclamation of surprise when first beheld. There is no name provided for such an object, nor is it worth while to invent one. Call it a dome; not because it has the ordinary shape of such a structure, but because it performs the functions of a dome.

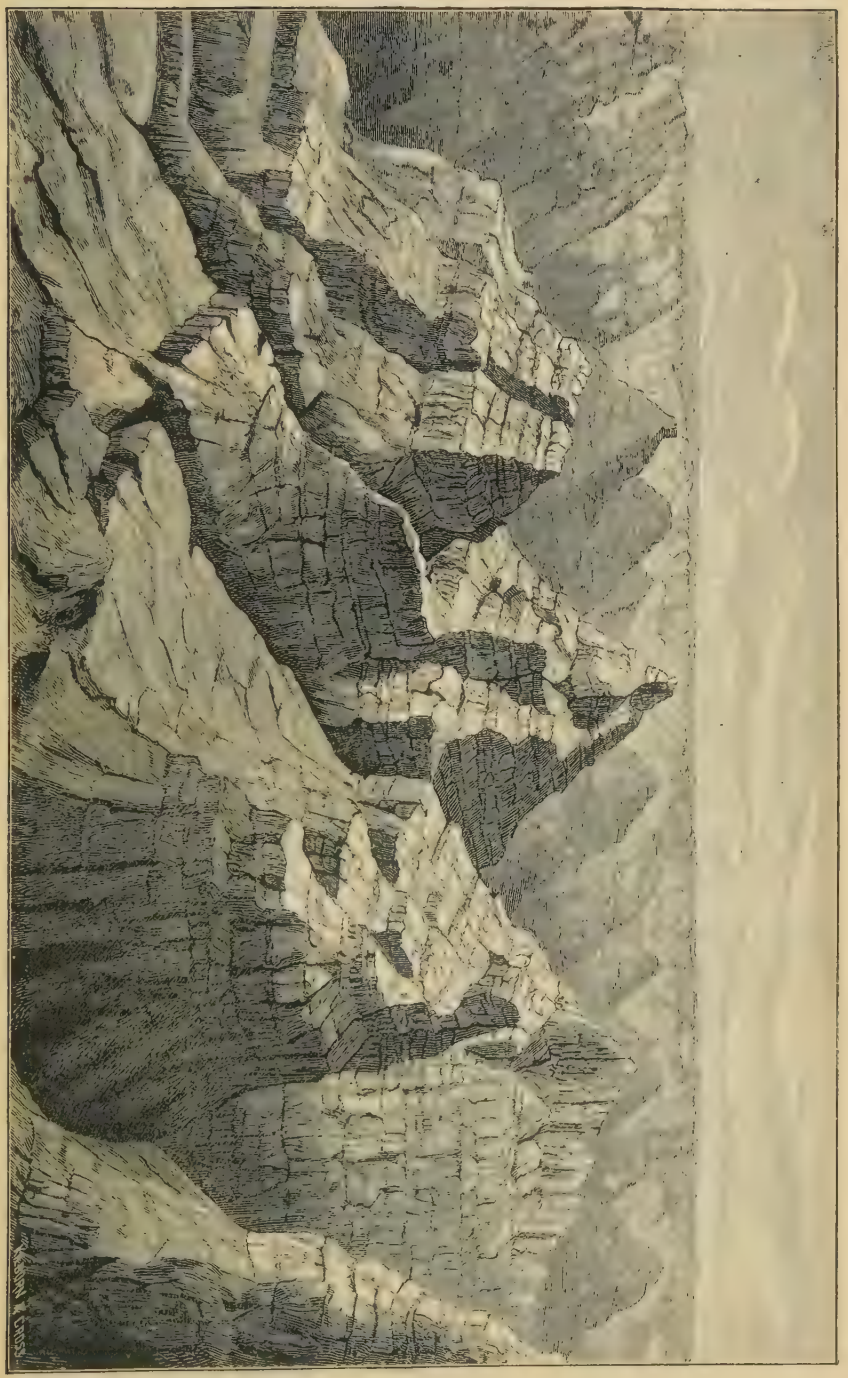
"The towers which surround it are of inferior mass and altitude, but each of them is a study of fine form and architectural effect. They are white above, and change to a strong, rich red below. Dome and towers are planted upon a substructure no less admirable. Its plan is indefinite, but its profiles are perfectly systematic. A curtain wall fourteen hundred feet high descends vertically from the eaves of the temple, and is succeeded by a steep slope of ever-widening base-courses leading down to the esplanade below. The curtain wall is decorated with a lavish display of vertical mouldings, and the ridges, eaves, and mitred angles are fretted with serrated crisps. The ornamentation is suggestive rather than precise, but it is none the less effective. It is repetitive, not symmetrical. But though exact symmetry is wanting, nature has here brought home to us the truth that symmetry is only one of an infinite range of devices by which beauty can be materialized.

"'And finer forms are in the quarry
Than ever Angelo evoked.'

"The finest butte of the chasm is situated near the upper end of the Kaibab division, but it is not visible from Point Sublime. It is more than five thousand feet high, and has a surprising resemblance to an Oriental pagoda. We named it Vishnu's Temple."[1]

Mr. Dutton continues: "Whatsoever is forcible, characteristic, and picturesque in the rock-forms of the Plateau Country is concentrated and intensified to the uttermost in the buttes. Wherever we find them, whether fringing the long escarpments of terraces or planted upon broad mesas, whether in cañons or upon expansive plains, they are always bold and striking in outline, and ornate in architecture. Upon their flanks and entablatures the decoration peculiar to the formation out of which they have been carved is most

[1] Capt. C. E. Dutton.



VISHNU'S TEMPLE.

strongly portrayed, and the profiles are most sharply cut. They command the attention with special force, and quicken the imagination with a singular power."

Moving northward, with grandeur on each side, Captain Dutton describes another butte still more surprising in its appearance, but, for reasons not mentioned, it was not photographed. "The controlling object was a great butte which sprang into view immediately before us, and which the salient of the wall had hitherto masked. Upon a pedestal two miles long and a thousand feet high, richly decorated with horizontal mouldings, rose four towers highly suggestive of cathedral architecture. Their altitude above the plain was estimated at eighteen hundred feet. They were separated by vertical clefts made by the enlargements of the joints, and many smaller clefts extending from the summits to the pedestal carved the turrets into tapering buttresses, which gave a graceful, aspiring effect, with a remarkable definiteness to the forms. We named it Smithsonian Butte."

Marble Cañon belongs to the Grand Cañon of the Colorado. The illustration conveys to the reader as correct an idea of its grandeur as can possibly be obtained without beholding the original. Dutton says: "The Grand Cañon of the Colorado crosses transversely the four western plateaus of the district, while the Marble Cañon traverses the eastern or fifth plateau. The two cañons are only nominally separated, for there is no gap between them. The Marble Cañon begins at the base of the eastern terraces. The Colorado River, after traversing the central mesas of the Plateau Country in a series of profound chasms, at length emerges from the echo of Triassic and Permian age. Here for an instant the river is in comparatively an open country. But within a mile or two it begins to sink another chasm in the carboniferous rocks, and in the course of sixty-five miles the depth steadily increases until it becomes about thirty-five hundred to four thousand feet. This is the Marble Cañon. It is a gorge of very simple form, and its width is about twice as great as its depth. Its course is at first southwest, but gradually deflects to the southward. Its lower end is arbitrarily fixed at the junction of the Little Colorado or Colorado Chiquito, a stream coming in from the southeast and entering by a lateral chasm as deep as the main gorge itself. Below the junction the river turns westward, the walls grow rapidly higher, the great chasm widens out to six or eight times its width in the Marble Cañon, and the valley of the river is filled with buttes as large as mountains and wonderfully sculptured. Here

MARBLE CAÑON.

the river enters the Kaibab, and its walls soon attain the altitude of six thousand feet."

Kanab Cañon is a division of the Grand Cañon, possessing many attractions in common with Marble Cañon. The cut shows that its massive and towering walls must excite the wonder of men. Everything about it is grand on a large scale. As an adjunct to the Grand Cañon, it is in complete harmony with its transcendent glories. The contemplation is inspiring and elevating. A man is better for taking in the sublime view. It awakens thoughts of the Great Architect, whose handiwork is so wonderful.

LAND OF THE STANDING ROCKS.

Captain Dutton writes: "A spectacle of this kind is most impressive to the geologist. It brings into one view the co-ordinated results of observations made laboriously by months of travel and inspection in a very broad and rugged field. The great distances through which the eye can reach, the aspect of cliffs towering above and beyond cliffs, the great cumulative altitude thus attained, the immensity of the masses revealed, the boldness of form, the distinctness of the lines of stratification, and especially the brilliant coloring, subdued indeed, but also refined by the haze, give to the scene a grandeur which has few parallels."

KANAB CAÑON.

Could anything be grander and more imposing than this "Land of Standing Rocks"? It is difficult to suppress the thought that human industry and art have here reared vast granite temples and towers, such as we read of in European cities. There has been no touch of the artist to exaggerate the scene, for it is taken from a faithful photographic view, and appears here just as it is in the wonderful cañon of which it is a part. (See p. 46.)

Albiquiu Peak is one of the most unique natural rock-formations in New Mexico, and it becomes more interesting in consequence of the ruins of an ancient pueblo which Macomb discovered on his way to the

ALBIQUIU PEAK.

peak. He says: "On the 19th of July we left Albiquiu for the ascent of the Albiquiu Peak. The train moving on to the Aroya Seco passed up the Chama to a point just beyond Albiquiu, and then turned to the left and ascended, by a long and difficult road, the high mesa which overlooks the valley on the south side. This mesa is here full a thousand feet above the Chama, and is connected with that of which the broken edge forms a bold headland below the town, known as Albiquiu Cliff. The mesa over which we passed extended, with a nearly level surface, several miles towards the peak. Arriving at the western border of this mesa, we looked directly down

into the narrow but fertile valley in which is nestled the little Mexican village of Los Cañones. Descending by a steep and tortuous path, we left our mules at the bottom and climbed a detached *mesilla* which stands at the junction of the two branches of the valley, and on which is situated an ancient and ruined pueblo, once a stone-built town of considerable size. Even its name is now lost, and of the inhabitants whose busy hands constructed its walls, and whose feet in successive generations wore so deeply the threshold of its entrance, no tradition now remains. The mesa on which it stands is some five thousand feet in height, and the top is only to be reached by a narrow and difficult path. The houses are now in ruins, but were once numerous, and all built of dressed stone. Within the town we noticed a dozen or more *estuffas* excavated from the solid rock. They are circular in form, eighteen to twenty feet in diameter by ten or twelve in depth. They all exhibited evidence of once having been covered with wooden superstructures. In most of them, four excavations on opposite sides would seem to have been used as the sockets for the insertion of wooden posts, and in one is a niche cut in the side, with a chimney leading from it; probably the place where the sacred fire was kept perpetually burning. The style of architecture in which the town was built, as well as the *estuffas*, show that its inhabitants belonged to the Pueblo Indians, a race now nearly extinct, but once occupying every habitable portion of New Mexico." [1]

Mr. Macomb continues: "Spending the night at Los Cañones, we started this morning very early for the ascent of the peak. This we mostly accomplished on mule-back, passing over a succession of hills composed of the variegated marls, — containing beds of gypsum of great thickness, — covered with a forest of piñon and cedar. When we had arrived within five hundred feet of the summit, we left our mules, and commenced the ascent on foot. This part of the mountain is very steep, and the upper two hundred feet is a perpendicular wall of trap-rock. The summit we found to form a *cuchillo*, a narrow, knife-like ridge, bounded on every side by vertical precipices. Its height above the sea is about nine thousand feet. The extreme summit is covered with piñon, and the slope with yellow pine, Douglas spruce, the western balsam fir, and the quaking-cap. The view from the summit was particularly fine, sweeping a circle of fifty miles' radius, except towards the buttes, which are very near, and fill the northeastern horizon."

[1] These ancient races are treated at length in Part II. of this volume.

Macomb says: "Everywhere over the second plateau are scattered buttes and pinnacles, wrought, from the massive calcareous sandstone and the overlying Saurian beds, by the erosion which has swept from the surface all traces but these of the immense mass of sedimentary rocks which once covered it. Of these, one of the most striking, seen from our route, is the Casa Colorado. It is a detached butte, some three hundred and sixty feet high, composed of sandstone covered with the harder layers of the Saurian beds. Another symmetrical and beautiful dome, composed of the same materials, is lemon-yellow, with a base of red."

CASA COLORADO BUTTE.

Macomb examined this butte (in New Mexico) in 1859, when on his expedition from Santa Fé to the junction of Grand and Green rivers for the United States Government. It will be observed that the height of the butte is just that of Bunker Hill Monument.

Captain Macomb writes: "From the pinnacle on which we stood the eyes swept over an area some fifty miles in diameter, everywhere marked by features of more than ordinary interest; lofty lines of massive mesas rising in successive steps to and from the frame of the picture, the interval between them more than two thousand feet below their summits. A great basin or sunken plain lay stretched

out before me as on a map. Not a particle of vegetation was anywhere discernible; nothing but bare and barren rocks of rich and varied colors, shimmering in the sunlight. Scattered over the plain were thousands of the fantastically formed buttes to which I have so often referred in my notes; pyramids, domes, towers, columns, spires, of every conceivable form and size. Among these, by far the most remarkable was THE FOREST OF GOTHIC SPIRES, first and imperfectly seen as we issued from the mouth of the Cañon Colorado. Nothing I can say will give an adequate idea of the singular and surprising appearance which they presented from this new and advan-

FOREST OF GOTHIC SPIRES.

tageous point of view. Singly, or in groups, they extend like a belt of timber for several miles. Nothing in nature or art offers a parallel to these singular objects; but some idea of their appearance may be gained by imagining the island of New York thickly set with spires like that of Trinity Church, but many of them full twice its height."

"A few miles north of Camp 39," says Captain Macomb, "is the southwestern corner of the Mesa Verde, which stretches from this point northward to our former trail, and eastward, forms the north bank of the San Joan as far as the eye can reach. It has an altitude

of two thousand feet above camp, and presents, with its many detached buttes and pinnacles, its long and lofty walls, a most grand and imposing object. On the south side of the river, now quite near to us, stand out in strong relief the picturesque basaltic pinnacles of 'The Needles,' while further south the view is bounded by the high ridges of the Carisso and Tunecha mountains.

"From Camp 40 we obtained a nearer and still better view of 'The Needles.' This is a mass of erupted rock, rising with perpendicular sides from the middle of the valley. From all points where seen by us, it has the appearance of an immense cathedral, of

THE NEEDLES.

rich, sombre brown color, terminating in two spires. Its altitude is about one thousand feet above its base; above the river, 2,262 feet. It is everywhere surrounded by stratified rocks, and its isolated position and peculiar form render its origin a matter of some little doubt. My conviction, however, is very decided that its remarkable relief is due to the washing away of the sediments which once surrounded it, and which formed the mold in which it was cast. In no other way can I imagine its vertical faces of one thousand feet to have been formed."

"To-day our course has been southeasterly," continues Captain

Macomb, "approaching the southern end of the Nacimiento, through a region much like that of yesterday, except that as we have now penetrated deeply into the Middle Crustaceous shales, the surface is less broken, the hills being rounded, with long, gentle slopes; the timber has become more sparse, the country less picturesque and inviting. We have here a fine view of all the interval between the Nacimiento and San Mateo. In the west and northwest, high mesas fill the horizon, forming the line of divide to which I have before referred. Around the base of Mount Taylor, extending many miles in every direction, is a plateau of trap, which has apparently flowed

CABAZON.

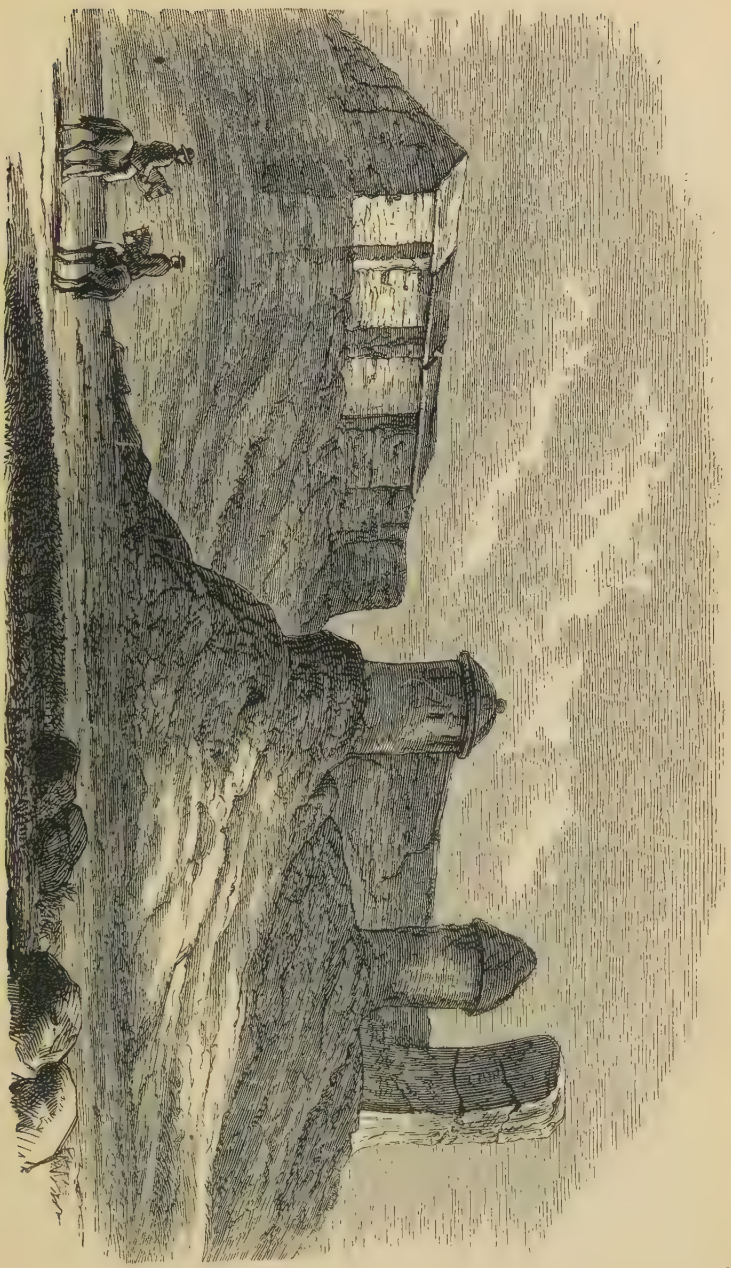
from this great extinct volcano, covering all the sedimentary rocks in its vicinity. In the open valley of the Puerco stand many picturesque trap buttes having a general resemblance to the needles of the San Juan. Of these the most conspicuous, called by the Mexicans CABAZON, resembles in its outline a Spanish sombrero, but is of gigantic dimensions, being at least fifteen hundred feet in height."

The reader must bear in mind, as he examines the illustration, the great height of this butte. At least FIFTEEN HUNDRED FEET! A monument of rock fifteen hundred feet high, and no art about it — all nature!

Most resplendent of all are the Painted Columns in this grand cañon, which Dutton, in his official report to the U. S. Government, describes as "belts of brilliant red, yellow, and white, which are in

PAINTED COLUMNS.

tensified, rather than alleviated, by alternate belts of gray. They culminate in intensity in the Permian and Lower Trias, where dark brownish reds alternate with bands of chocolate, purple, and lavender, so deep, rich, and resplendent that a painter would need to be a bold man to venture to portray them as they are."



NATURAL SANDSTONE FORMATIONS.

Mr. Cozzens, in his "Three Years in Arizona and New Mexico," describes the scenes in the district of the Grand Cañon of Colorado, which we transfer to our pages.

These remarkable formations stand out bold and high, and are situated on the "Santa Rita del Cobre," Arizona. The towers on the right are singularly artistic, and yet they are not so marvellous as the almost perfect barracks on the left. If men had no hand in these creations, and invisible spirits were not the workmen, then our material world must be under the control of as exact laws as the spiritual.

Mr. Cozzens, who first brought these sandstone formations to the attention of the public, says: —

"We spent several days in this vicinity, during which time we visited some remarkable sandstone formations near by. We found about forty columns, worn by the winds and rains into most singular shapes. One of them measured nearly sixty feet in height, and more closely resembled an inverted bottle than anything we could compare it to. At its greatest circumference it measured eighteen feet, while at its base it was scarcely three feet. Some looked like churches, towers, castles, or barracks, and others very like human beings of colossal proportions. So striking were these resemblances, that it was hard to believe the hand of man had nothing to do with their formation."

The City not made with Hands, is also a sandstone formation more marvellous than that just described; and we are indebted to Mr. Cozzens for the view. He says: —

"Half-way across this vast sandy plain two or three blue specks were visible, which, our guide informed us, were salt lakes; also, that it was from the shores of these lakes that the Spaniards formerly procured their salt, and even the present inhabitants used it to a large extent. He said that in close proximity to these lakes was a very peculiar sandstone formation, well worth seeing; and, as all were but a few miles distant from our direct route, we determined to visit them. Bringing our glasses to bear upon that portion of the plain pointed out by the guide, we saw what seemed to us to be a large city, with its spires and domes and towers glittering in the bright sunlight, and rivalling in splendor the creations of the genii conjured by Aladdin's wonderful lamp."

The next day he and his party came into the immediate vicinity of the glittering city. He continues: —

"The next morning the guide called us to behold the wonderful effect of the rising sun upon the city of enchantment that we had seen from the mountain the day before. As we approached this marvellous architecture of the elements, we could not repress excla-

A CITY NOT MADE WITH HANDS.

mations of wonder and delight. Streets were plainly visible ; massive temples with their spires and domes ; monuments of every conceivable shape ; castles of huge proportions ; towers and minarets, all

formed of pure white silica, which glittered in the bright sunlight like walls of crystal. It was hard to persuade ourselves that art had no part in forming these graceful testimonials to the wonders of nature.

"'Surely,' said Dr. Parker, 'this must be a city.'

"'Yes,' replied I, 'a city, but not made with hands.'

"Around the whole was a massive wall ten feet in height, with arched gateways and entrances as perfect as it is possible for the imagination of man to conceive. Entering the confines of this magical spot, we were soon undeceived, for what in the distance our own imagination had conceived to be enchanted ground, was, in reality, a mass of white sandstone, worn by the winds and waters into a wonderful similitude of a magnificent city."

Who wonders that explorers have become enthusiastic over the wealth of scenery in the Grand Cañon of the Colorado? that the English vocabulary has been depleted of adjectives to express human amazement and admiration over its revelations? "There are," says Nordhoff, "Americans who saw Rome before they saw Niagara, who saw Mont Blanc before they saw the Yosemite, and who saw the Alps and the Pyrenees before they saw the Rockies and the Sierras. Let them have seen all of these, with the Urals, the Andes, and the Himalayas thrown in; let them have seen the boiling geysers of Iceland and the belching craters of Ætna and Chimborazo; let them have looked upon the wonders of the Yellowstone and listened to the roar of Niagara; let them have traversed all the rest of the world, and until they have seen the Grand Cañon of the Colorado, the world's greatest wonder yet awaits them. Imagine Mount Washington cleft from crest to base, and the sides of the chasm pushed apart half a mile. Then imagine enough Mounts Washington, split in like manner and put irregularly together, to form a zigzag gorge three hundred miles long, and you have some idea of what this cañon is. Perpendicular walls on either side of the river five thousand to seven thousand feet in height! Think of it! More than a mile of rocky cliff towering above you! Look down from the lofty brink, and you see the river, like a silver thread, following the contour of the mighty abyss. Look up from beneath through its mile-high walls, count the stars at midday, and realize that a cannon ball would hardly reach the lofty summit."

Captain Dutton, who speaks officially for the United States Government, says: "Those who have long and carefully studied the Grand Cañon of the Colorado do not hesitate for a moment to pro-

nounce it far the most sublime of all earthly spectacles. If its sublimity consisted only in its dimensions, it could be sufficiently set forth in a single sentence. It is more than two hundred miles long, from five to twelve miles wide, and from five thousand to six thousand feet deep. There are in the world valleys which are longer and a few which are deeper. There are valleys flanked by summits loftier than the palisades of the Kaibab. Still the Grand Cañon is the sublimest thing on earth. It is not alone by virtue of its magnitude, but by virtue of its whole, its *ensemble.*"

YELLOWSTONE NATIONAL PARK.

We might very appropriately present the marvels of this locality under the division of cañons, since the mighty gorge of the Yellowstone is a cañon of surpassing beauty and sublimity. But an act of Congress has set apart this domain for a national park, thus giving it special prominence in the public mind, so that we are disposed to give it kindred importance in treating of its marvels.

The National Park is situated in the northwestern part of the Territory of Wyoming, embracing a small section of Idaho and Montana. Its area is sixty-five miles long and fifty-five wide, or about 3,575 square miles, considerably larger than Rhode Island and Delaware together. It is surrounded by mountain ranges which lift their lofty peaks from ten to twelve thousand feet above the sea.

Nothing definite was known of this locality until 1869. True, trappers and adventurers went thither before that time, but their reports were so incredible that no one believed them. Some of them were wholly unworthy of credence, because they were the exaggerations of the imagination, as the following will show: —

"In many parts of the country petrifactions and fossils are very numerous, and, as a consequence, it was claimed that in one locality (I was not able to fix it definitely) a large tract of sage is perfectly petrified, with all the leaves and branches in perfect condition, the general appearance of the plain being *unlike* (like?) that of the rest of the country; *but all is stone;* while the rabbits, sage hens, and other animals usually found in such localities are still there, perfectly petrified, and as natural as when they were living; and, more wonderful still, the petrified bushes bear the most wonderful fruit; diamonds, rubies, sapphires, emeralds, etc., etc., as large as black walnuts, are found in abundance."

Messrs. Cook and Folsom explored the Yellowstone country in

1869, and their report of its marvels awakened public attention. In 1871 Captains Barlow and Keep, of the United States Service, made quite extensive explorations; and the same year Dr. Hayden made an extended tour through it, giving the results of his researches in a report so filled with wonderful revelations as to greatly interest the members of Congress. He recommended that the Yellowstone country should be set apart for a national park; and his recommendation was adopted in 1872 with little opposition.

It will be seen, therefore, that the marvels of the park have recently become known to the public. Singular as it may appear, we have lived near this wonderful valley, and travelled around it for years, and been ignorant of its wonders. The vast extent of our country, offering such ample fields for exploration elsewhere, in the interest of fortune or pleasure, is a sufficient explanation of the fact that we have lived upon the borders of this fairyland so long without knowing it.

An English lady, familiar with the finest scenery of Europe, wrote home from this region of marvels: "I am here in a place which, singularly enough, they call Wonderland. Not that the title is by any means inappropriate, for the place is, indeed, a land of wonders; but the coincidence, at least, is somewhat remarkable, for you know what the associations of that word 'Wonderland' are to me. Well, here I am, rubbing my eyes every day, to be sure that I am not either in a dream or in a new world. You never saw, nor could you ever imagine, such strange sights as greet us here at every turn. It is not only that everything is big; that is characteristic of the whole country, everything in nature being on a much larger scale than we are accustomed to in Europe. But besides the Rocky Mountains and a waterfall, — and a big one too, twice as high as Niagara, — there is the grandest old lot of geysers and boiling springs in the world, and a river shut in for several miles of its course by mountains rising hundreds of feet above it, — what they call a cañon (pronounced *canyon*), the walls of which are of such glowing colors that papa said he could compare it to nothing but the most gorgeous sunset he had ever seen."

The Mammoth Hot Springs are situated a thousand feet above the banks of Gardiner River, into which their constant overflow runs. They appear in terraces, tier upon tier, as if laid out by a skilful engineer. The hot water takes up calcareous matter in its course, and deposits it below. "The slow but ceaseless operation of the springs has resulted in building up terrace after terrace of scallop-

edged, limpid pools and basins of hot water, of varied size, form, and temperature."

Mr. Wisner says: "The ascent to the main terrace of active springs is not difficult. Stepping upon the first of a series of broad

MAMMOTH HOT SPRINGS.—MAIN TERRACE.

ledges which lead to the base of the terrace, the way is threaded through a maze of rills of hot water over the low scalloped rims of limpid, steaming pools, which it seems sacrilege to tread. The novelty and magnificence of the scene are bewildering. Not distance, but

proximity, lends enchantment to the view. The brilliancy and variety of the coloring matter about the pools, as well as the delicacy and beauty of the formations, are indescribably wonderful. Terrace after terrace is thus surmounted, some of these eight or ten feet high and several yards in width; others are mere ledges. On each of these levels the water collects in a long tier of nearly semicircular basins, of different diameters, lying close together. The higher terraces present an imposing front, the contour of their scalloped margins at once suggesting frozen water-falls. Over the rims of the basins on the topmost level the water generally pours until it finds its way into the reservoirs next below, repeating this process till the bottom of the hill is reached, where the flow is collected and carried off by several channels to the Gardiner River.

"The deposits which result from evaporation at the margin of each basin are exquisite in form and color. The rims are fretted with a delicate frost-work, and the outside of each bowl is beautifully adorned with a honeycomb pattern, while the spaces between the curves are often filled with glistening stalactites. The coating of the sides of the basins and pools takes on every delicate and vivid tint, rich cream and salmon colors predominating, but these deepening near the edges into brilliant shades of red, brown, green, and yellow. The largest springs, supplying most of the water to the tiers of bowls on each of the terraces, are situated on a broad, level space covering some acres at the top of the hill. One has a basin forty feet in length by twenty-five in width. Others are nearly as great. The water is a turquoise blue, and so perfectly translucent that the most microscopic fretting deep down upon the sides and bottoms of the pools is plainly visible. This is the case with the hot spring-water everywhere. Its crystal clearness cannot be described; it must be seen to be appreciated. The crust between the springs seems rather treacherous to the foot, and it is impossible to get about without soaking the shoes in hot water. Most of the springs have two centres of ebullition, at which, doubtless, the water is at the boiling point; but at the edges the temperature is much lower. Around the hottest pools, in many cases, there are strung along the rim, like beads on a necklace, a row of nodules large as hazel-nuts and hard as adamant. The play of the waters as they seethe up from the cavernous throats of the pools, and undulate in miniature waves, is wonderful. The rays of light are refracted by the agitation upon the surface, and are resolved into all the colors of the prism."

There are a multitude of hot springs in the Park, many of them

sufficiently hot for cooking all sorts of game. Tourists amuse themselves by pulling fish out of Yellowstone Lake, and without removing them from the hooks, dropping them into a boiling spring near by, where they are soon cooked sufficiently for the table. Nature's culinary arrangements appear to be about as fine here as the wildest imagination could invent.

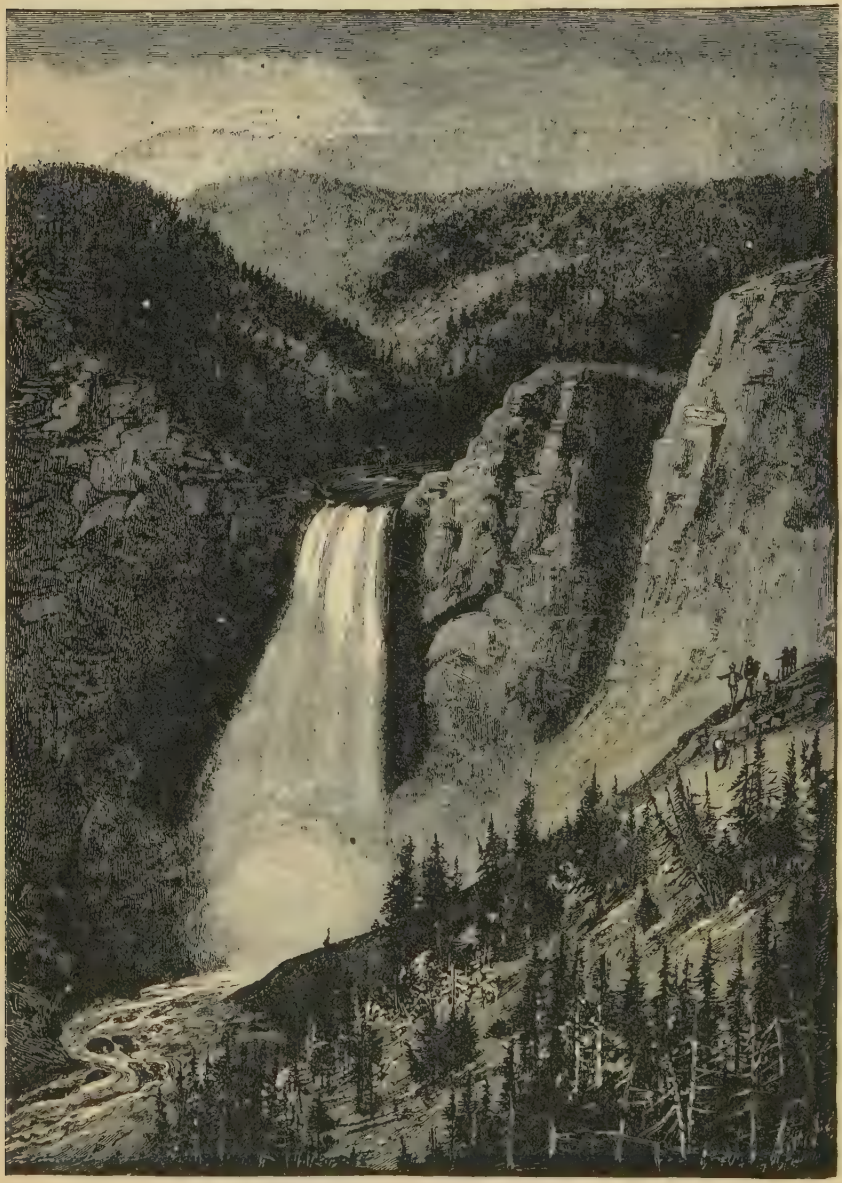
Mr. Wisner adds: "This calcareous deposit covers an area of three square miles. Of this, the recent deposits, on which the springs are at present found, occupy about one hundred and seventy acres. Along the river bank there are still many active boiling springs. For a mile up the hillside there is terrace after terrace of extinct springs. Then comes the principal point of present activity, which extends with gradually waning power over a distance of a mile into the dense woods on the top of the mountain. There are fourteen well-defined terraces within the bounds mentioned, which are now, or have been at one time, the scene of boiling-spring activity."

From the foot of the Upper Falls the river turns somewhat abruptly to the left, pursuing its impetuous way through a pine-clad gorge, over a rocky bed, towards the Grand Cañon, into which the Great Falls plunges with a roar and majesty indescribable. The fall is at least three hundred feet, or twice that of the world-renowned Niagara. Mr. Wisner says: "The scene from the brink of the fall, looking into the profound depth of the cañon, is of strange majesty and indescribably awe-inspiring. A roomy platform at the edge of the fall, with a staunch railway on the river side, affords a very good view of the river preparing for its leap. The advancing volume of water flows rapidly but solidly to the brink, and falls with a tremendous shock into a large circular foaming caldron, bounded by steep cliffs eight hundred feet high. The masses of water seem to break into fleecy columns and sheets of glistening foam as they descend; but they nevertheless strike the surface of the pool below with a concussion so heavy that they are forced upwards in fountains of spray and clouds of mist which wash the sides of the cañon, nourishing a rank growth of mosses and algæ of every grade of green, ochre, orange, saffron, red, scarlet, and brown."

Mr. Gannett speaks as follows of the height of the falls: —

"My measurement of the Lower Fall was not as simple in method, and allows more room for error than in the case of the Upper Fall. I found a point by means of the clinometer on the eastern wall of the cañon, and very near the fall, at the same level as its top. Thence I stretched the line down the cañon wall to the level of the

foot of the fall, reaching it at a point so close that we received a thorough drenching from the spray. Then, with a clinometer, I



GREAT FALLS OF THE YELLOWSTONE.

measured as accurately as possible the angle of inclination of the line. This gave as the height two hundred and ninety-seven feet.

Though this result cannot be regarded as strictly accurate, still its error must be small, and, in round numbers, three hundred feet may be regarded as a close approximation to the true height. Ludlow measured this fall directly by means of a sounding-line, obtaining three hundred and ten feet as the height, a result agreeing quite closely with mine, especially when one reflects on the difficulty of determining when the weight was at the base of the fall, in the cloud of mist and the rushing river. Most of the other measurements are barometric. Such was that of Captain Jones, who gave a height of 328.7 feet."

We are able to furnish a view of the Grand Cañon of the Yellowstone where the waters of the Great Fall tumble into it. Let the reader study this remarkable picture, to see what wonderful sculpturing nature has done here, and what towers and pilasters and spires and pillars the Great Architect has reared within this awful gorge. It is not only the colossal grandeur of colonnade rising eight hundred feet and more above the foaming cataract; but all the colors of the rainbow are painted upon those fretted walls, often blending in harmonious shades, to vie with the finest work which the artist spreads upon canvas.

Rev. Dr. Wayland Hoyt most graphically described the cañon as he beheld it, as follows: —

"And now, where shall I begin, and how shall I, in any wise, describe this tremendous sight — its overpowering grandeur, and, at the same time, its impressible beauty?

"Look yonder — those are the Lower Falls of the Yellowstone. They are not the grandest in the world, but there are none more beautiful. There is not the breadth and dash of Niagara, nor is there the enormous depth of leap of some of the falls of the Yosemite. But here is majesty of its own kind, and beauty too. On either side are vast pinnacles of sculptured rock. There, where the rock opens for the river, its waters are compressed from a width of two hundred feet between the Upper and Lower Falls to one hundred feet where it takes the plunge. The shelf of rock over which it leaps is absolutely level. The water seems to wait a moment on its verge; then it passes with a single bound of three hundred feet into the gorge below. It is a sheer, unbroken, compact, shining mass of silver foam. But your eyes are all the time distracted from the fall itself, great and beautiful as it is, to its marvellous setting — to the surprising overmastering cañon into which the river leaps and through which it flows, dwindling to but a foamy ribbon there in its appalling depths. As you cling here to

GRAND CAÑON OF THE YELLOWSTONE.

this jutting rock the falls are already many hundred feet below you. The falls unroll their whiteness down amid the cañon glooms. . . . These rocky sides are almost perpendicular; indeed, in many places the boiling springs have gouged them out so as to leave overhanging cliffs and tables at the top. Take a stone and throw it over — you must wait long before you hear it strike. Nothing more awful have I ever seen than the yawning of that chasm. And the stillness, solemn as midnight, profound as death! The water dashing there, as in a kind of agony, against those rocks, you cannot hear. The mighty distance lays the finger of its silence on its white lips. You are oppressed with a sense of danger. It is as though the vastness would soon force you from the rock to which you cling. The silence, the sheer depth, the gloom, burden you. It is a relief to feel the firm earth beneath your feet again, as you carefully crawl back from your perching place.

"But this is not all, nor is the half yet told. As soon as you can stand it, go out on that jutting rock again and mark the sculpturing of God upon those vast and solemn walls. By dash of wind and wave, by forces of the frost, by file of snow plunge and glacier and mountain torrent, by the hot breath of boiling springs, those walls have been cut into the most various and surprising shapes. I have seen the Middle Age castles along the Rhine: there those castles are reproduced exactly. I have seen the soaring summits of the great cathedral spires in the country beyond the sea: there they stand in prototype, only loftier and sublimer.

"And then, of course, and almost beyond all else, you are fascinated by the magnificence and utter opulence of color. Those are not simply gray and hoary depths and reaches and domes and pinnacles of sullen rock. The whole gorge flames. It is as though rainbows had fallen out of the sky and hung themselves there like glorious banners. The underlying color is the clearest yellow; this flushes onward into orange. Down at the base the deepest mosses unroll their draperies of the most vivid green; browns, sweet and soft, do their blending; white rocks stand spectral; turrets of rock shoot up as crimson as though they were drenched through with blood. It is a wilderness of color. It is impossible that even the pencil of an artist can tell it. What you would call, accustomed to the softer tints of nature, a great exaggeration, would be the utmost tameness compared with the reality. It is as though the most glorious sunset you ever saw had been caught and held upon that resplendent, awful gorge.

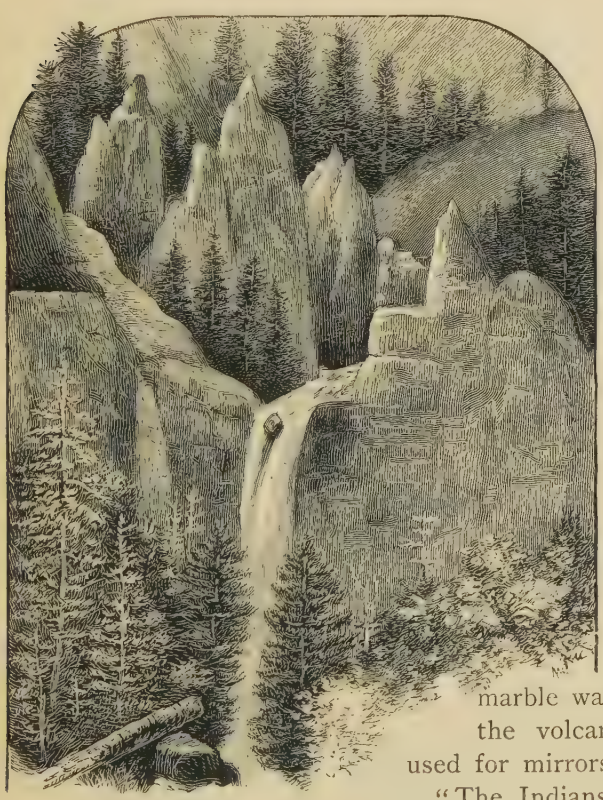
"Through nearly all the hours of that afternoon until the sunset shadows came, and afterwards, amid the moonbeams, I waited there, clinging to the rock, jutting out into that overpowering, gorgeous chasm. I was appalled and fascinated, afraid and yet compelled to cling there. It was an epoch in my life."

Glass Cliffs are not usual. Sight-seers are usually satisfied with sandstone or granite ones, provided they are tall enough. But here are cliffs composed of volcanic glass, with a glass road along their base. Nature made the cliffs just as they are, but *man* made the road of materials which nature furnished. Mr. Wisner describes the cliffs thus: —

OBSIDIAN CLIFFS.

"These cliffs rise like basalt in almost vertical columns from the eastern shores of Beaver Lake, and are probably unequalled in the world. They are from one hundred and fifty to two hundred and fifty feet in height and one thousand feet in length, although there are croppings of the same material to be traced as far as the Lake of the Woods, two miles beyond. This volcanic glass glistens like jet, but is quite opaque. Sometimes it is variegated with streaks of red and yellow. Large blocks of it have been, from time to time, detached, forming a sloping barricade at an angle of 45° to the hot springs at the margin of Beaver Lake. It was necessary to build a carriage road over these blocks. This was

accomplished by Colonel Norris, late superintendent of the Park, by building great fires upon the largest masses, which, after they had been sufficiently expanded by the heat, were suddenly cooled by dashing cold water over them. This had the effect of fracturing the blocks into fragments which could be handled, and a glass carriage-way a quarter of a mile in length was made. Without doubt this is the only piece of glass road in the world. Blocks of obsidian are to be found along the Gardiner River for a few miles below the cliffs, and the whole region from Paradise Valley, in the Upper Yellowstone, southward, is strewn with chips and pebbles of this material. On the bays of the Yellowstone Lake, and in many of the clear stream beds, tiny fragments of obsidian are to be seen glittering like gems.



TOWER FALLS.

"Obsidian is a species of lava, which, according to Pliny, was first found in Ethiopia. The name, however, seems to have been applied by the ancients to Chian marble, and is probably a false spelling of the Greek *opsianus*, signifying to reflect images, because the Chian marble was as hard to cut as the volcanic glass and was used for mirrors.

"The Indians used this glass in making arrow-heads, weapons, and tools. Relics of this sort, which tourists find, seem to be made of the superior quality of obsidian which was procured at the cliffs. An impure variety, black, with white flecks, is common at other points within the Park, notably near the Great Falls of the Yellow-

stone, at the cascade at Crystal Falls, near Shoshone Lake, on the Continental Divide."

It is twenty-one miles from the Mammoth Hot Springs to Tower Falls, and a very good wagon road leads thither. The distance between the two localities is crowded with marvels, such as the lava beds of Blacktail Deer, and other creeks, Hell-roaring Creek, Dry Cañon, and down the mountain slope of two thousand feet into Pleasant Valley and Baronette's Bridge, at the forks of the Yellowstone River. "The Falls are surrounded by columns of volcanic breccia, rising fifty feet above them, standing like the towers upon some mediæval fortress." The fall is one hundred and thirty-two feet. Mr. Langford, superintendent of the Park, says: "Some resemble towers, others the spires of churches, and others still shoot up little and slender as the minarets of a mosque. Some of the loftiest of these formations, standing upon the very brink of the Falls, are accessible to an expert and adventurous climber. The position attained on one of these narrow summits, amid the uproar of waters, to the height of two hundred feet above the boiling chasm, as the writer can affirm, requires a steady head and strong nerves; yet the view which rewards the temerity of the exploit is full of compensations. Below the fall the stream descends in numerous rapids with frightful velocity, through a gloomy gorge, to its union with the Yellowstone. Its bed is filled with enormous bowlders, against which the rushing waters break with great fury. Many of the capricious formations wrought from the shale excite merriment as well as wonder. Of this kind especially is the huge mass, sixty feet in height, which, from its supposed resemblance to the proverbial foot of his Satanic Majesty, is called the Devil's Hoof. The scenery of mountain, rock, and forest, surrounding the Falls, is very beautiful. The name of Tower Falls was, of course, suggested by some of the most conspicuous features of the scenery."

Lieutenant Doane, in his report to the United States Government, says: "The sides of the chasm are worn into caverns, lined with various tinted mosses, nourished by clouds of spray which rise from the cataract; while above, and to the left, a spur from the great plateau rises over all, with a perpendicular front of four hundred feet. Nothing can be more chastely beautiful than this lovely cascade, hidden away in the dim light of overshadowing rocks and woods, its very voice hushed to a low murmur, unheard at the distance of a few hundred yards. Thousands might pass within a half

mile, and not dream of its existence; but once seen, it passes to the list of most pleasant memories."

KEPLER'S CASCADES ON THE FIREHOLE RIVER.

A marvel indeed! It is one of the things of nature which cannot be extravagantly described. After making large drafts upon the "King's English," there is still some margin left for accurate por-

trayal. The symmetry of these cascades is one of their chief attractions, so exact to the demands of Art has Nature been. Mr. Wisner has the following about them: —

"These beautiful cascades are situated about two miles eastward of Old Faithful Geyser. They consist of a succession of eight or ten cascades of varying height, the highest, perhaps, fifty feet. The water has cut a narrow channel through the basaltic rock, forming a profound cañon, through which the torrent frets and fumes in wild tumult. From the best point of observation, a high and rocky plateau some distance below the principal cascade, the scene is quite romantic and picturesque. The foaming waters rush down the gorge, roaring and tumbling against the solid walls of rock which hem them in. The cañon is very deep, and its sheer descent is broken by rough and jagged crags which beetle over the stream. Slender, symmetrical pines, straight as lances, grow on the brink of the cañon, and on the inclosing mountain slopes, as far as the vision reaches. They also cling to every nook and cranny on the sides of the terrible gorge, standing like sentinels on every moss-clad point of vantage. Westward lie the purple mountains, majestic in outline, and clothed with the virgin forest of sombre pine. In the middle distance arise filmy columns of vapor from the geysers and hot springs of the Upper Basin, floating upward, and fading into space, as an incense offering to the Creator of the wondrously beautiful scene. Kepler's Cascades are really quite bewitching in their loveliness, the harmony of the picture leaving nothing to be desired, as the romantic is here picturesquely perfect, the colors of the vegetation on the rocks in contrast to the foaming water delighting the eye. The visitor reluctantly leaves this idyllic spot."

Yellowstone Park can boast of one of the most wonderful buttes known, as the illustration proves (p. 73). Nature has built up here a stone palace, of which Art itself might well be proud. It is remarkable workmanship, when we consider that it was built without square or compass or the sound of a hammer. Its size, form, and symmetry impress the beholder as only a marvel can.

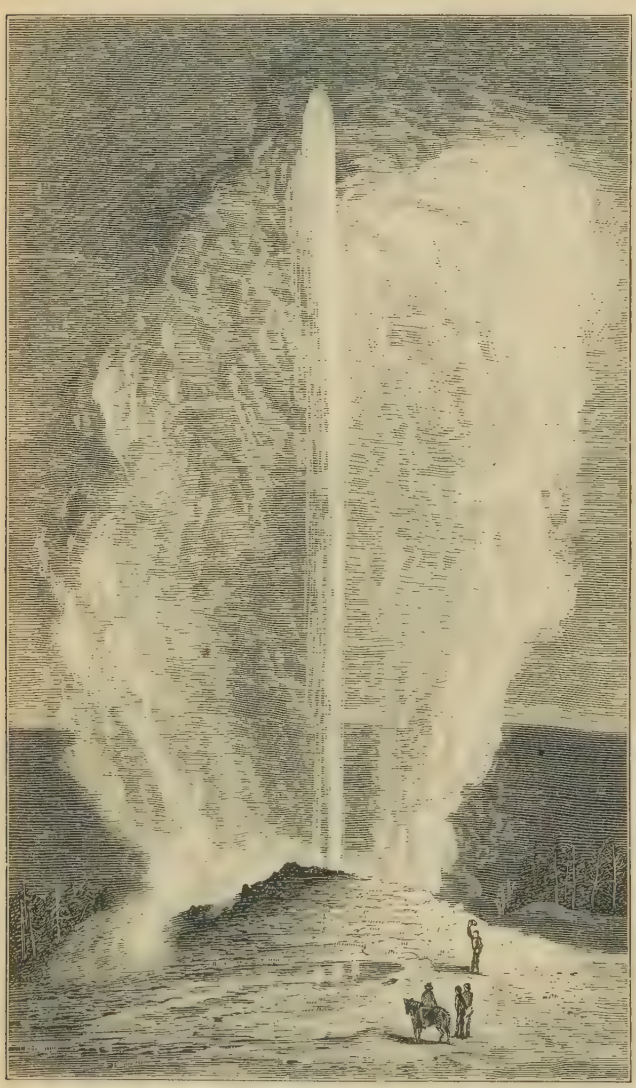
GEYSERS.

The geysers are the great marvels of the Yellowstone Park. They are very numerous, and many of them are beautiful and grand beyond description. The most important ones are found in "The Upper

On the Line of U. P. Railroad.

PALACE BUTTE.

Geyser Basin," which extends "from Old Faithful down the main Firehole River to a point just below the mouth of the Little Firehole River, and along Iron Spring Creek, a branch of the last-named stream." This basin is four miles square, but the chief geysers are situated on both sides of the river within a half-mile. It is surrounded by mountains rising fifteen hundred feet, their sides being quite heavily timbered. Here opens a scene of splendor. "Clouds of steam hang as a pall over the Basin, and columns of vapor float upward like water wraiths from between the tree-tops of the surrounding forests. The earth is full of rumbling and gurgling sounds, and the air is laden with sulphurous fumes. Stupendous fountains of boiling water, veiled in spray, shoot toward heaven, at varying heights, like cascades reversed, glinting and coruscating and scintillating in the sun-



OLD FAITHFUL GEYSER.

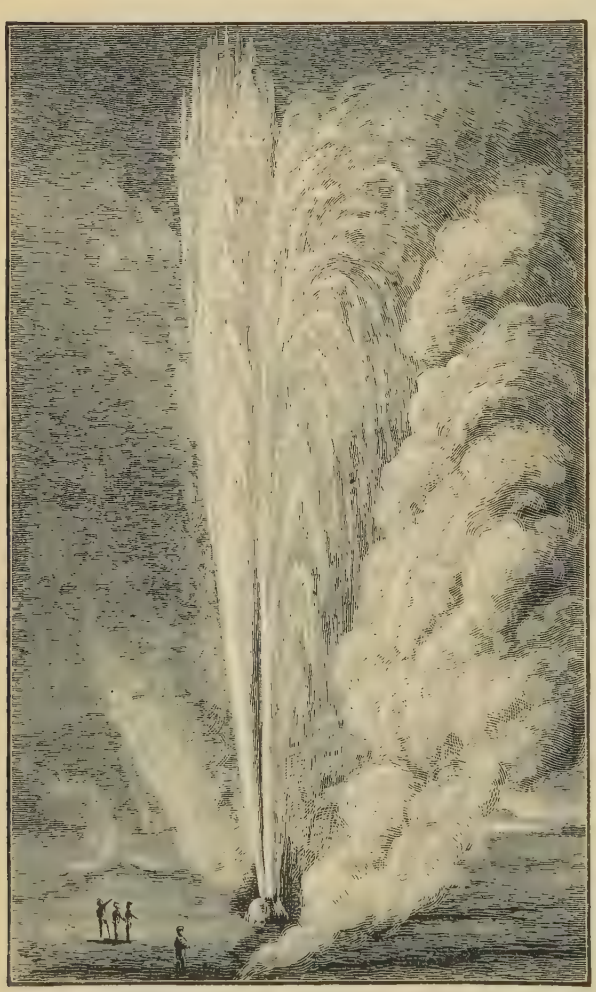
light until their force is expended, when they fall in showers of flashing pearls with a shock that shakes the ground. Of course, the various geysers of the Basin are never simultaneously in action. The periods of eruption of each one of them are more or less irregular. Many geysers which now exist will, doubtless, sooner or later cease operation, and new ones will form to take the place of those which dwindle away."

We rely chiefly upon the report of the United States Geological Survey, under the direction of Dr. F. V. Hayden, for a description of the principal geysers.

The eruptions of the Old Faithful geyser are so regular that a favorable opportunity is offered the tourist for careful observation. It played once an hour for the benefit of the United States Survey, who highly appreciated their opportunity. It was this characteristic of the geyser which led the Survey to christen it "Old Faithful." The eruption begins with from six to twelve spurts, continuing about four minutes, growing more powerful, and then followed by a remarkable succession of jets, accompanied by a startling roar and clouds of steam, the water shooting upward into the air one hundred and fifty feet at its maximum.

Lieutenant Doane, of the expedition, wrote: "Close around the opening are built up walls eight feet in height, of spherical nodules from six inches to three feet in diameter. These, in turn, are covered on the surface with minute globules of calcareous [silicious] stalagmite(?), encrusted with a thin glazing of silica. The rock at a distance appears the color of ashes of roses, but near at hand shows a metallic gray, with pink and yellow margins of the utmost delicacy. Being constantly wet, the colors are brilliant beyond description. Sloping gently from this rim of the crater in every direction, the rocks are full of cavities in successive terraces, forming little pools, with margins of silica the color of silver, the cavities being of irregular shape, constantly full of hot water, and precipitating delicate coral-like beads of a bright saffron. These cavities are also fringed with rock around the edges in meshes as delicate as the finest lace. Diminutive yellow columns rise from their depths, capped with small tablets of rock, and resembling flowers growing in the water. Some of them are filled with oval pebbles of a brilliant white color, and others with a yellowish frost-work which builds up gradually in solid stalagmites(?). Receding still farther from the crater, the cavities become gradually larger and the water cooler, causing changes in the brilliant colorings, and also in the formation of the deposits. . . .

The deposits are apparently as delicate as the down on the butterfly's wing, both in texture and coloring, yet are firm and solid beneath the tread. . . . Those who have seen the stage representations of 'Aladdin's Cave' and the 'Home of the Dragon-Fly,' as produced in a first-class theatre, can form an idea of the wonderful coloring, but not of the intricate frost-work of this fairy-like yet solid mound of rock, growing up amid clouds of steam and showers of boiling water. One instinctively touches the hot ledges with his hands, and sounds with a stick the depths of the cavities in the slope, in utter doubt in the evidence of his own eyes. The beauty of the scene takes away one's breath. It is overpowering, transcending the visions of the Moslem's Paradise."



On the Line of U. P. Railroad.

BEE HIVE GEYSER.

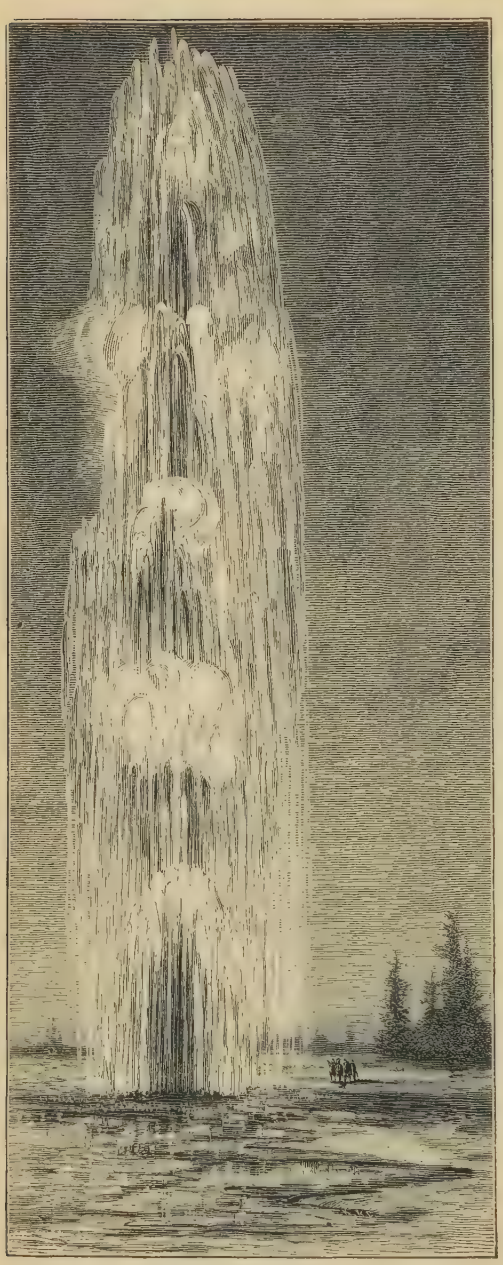
Dr. Hayden wrote: "With little or no preliminary warning, it shot up a column of water about *six feet in diameter* to the height of one hundred to one hundred and fifty feet, and by a succession of impulses seemed to hold it up steadily for the space of fifteen minutes, the great mass of the water falling directly back into the basin,

and flowing over the edges and down the sides in large streams. When the action ceases, the water recedes beyond sight, and nothing is heard but the occasional escape of steam until another exhibition occurs. This is one of the most accommodating geysers in the basin, and during our stay played once an hour quite regularly."

Bee Hive Geyser was so named because of the resemblance of its cone to an old-fashioned straw beehive. Its cone is from three to five feet in height, and five feet in diameter at its base. A member of the survey party says of it: "Not one of our company supposed that it was a geyser, and among so many wonders it had almost escaped notice. While we were at breakfast, upon the morning of our departure, a column of water, entirely filling the crater, shot from it, which, by accurate triangular measurement, we found to be two hundred and nineteen feet in height. The stream did not deflect more than four or five feet from a vertical line, and the eruption lasted eighteen minutes."

Another member of the expedition wrote: "It is beautifully coated with beaded silica. There is no surrounding terraced deposit, as there is about most of the craters. This is probably due to the fact that very little water falls around it. The orifice on the summit of the cone measures two feet by three, and a line dropped into the tube reaches a depth of twenty-one feet. Just outside of the cone are several vents or steam-holes, one of which acts as a sort of preliminary vent or signal for the eruption of the geyser. The eruption of the Bee Hive is very fine and peculiar to itself, no other geyser in the basin acting in the same manner. It is preceded by a slight escape of steam in a steady stream of great force, much as water is projected from the nozzle of hose used with steam fire-engines. The column is somewhat fan-shaped, and keeps a high average height. The ground is shaken during the action. The geyser acts certainly once in twenty-four hours, and occasionally oftener." On the 18th of September, 1882, the writer observed two fine eruptions with an interval of only fourteen hours. The height of the column varies from a hundred and seventy to two hundred and nineteen feet; and when the spray is between the beholder and the sun, a magnificent rainbow is visible.

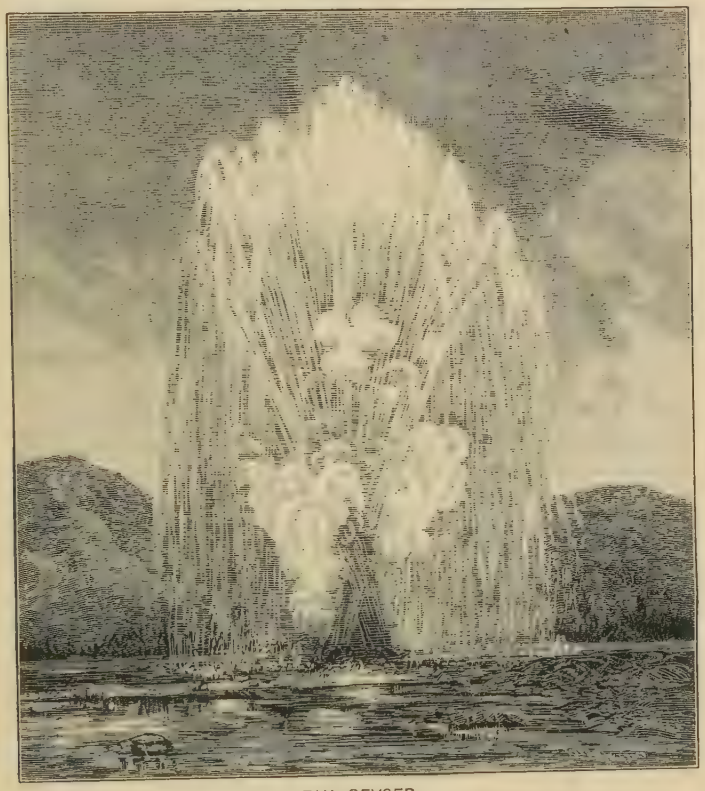
The Giantess Geyser has no cone. It is situated four hundred feet from the Bee Hive, higher up, and spouts from the top of the ground. Its aperture is twenty-four by thirty-four feet. The depth of its basin is sixty-three feet. The eruption occurs once in fourteen days, and it sends up a mighty column two hundred and fifty feet into



THE GIANTESS GEYSER.

the air, which assumes the form of separate fountains, one above the other. The eruption is accompanied with deep rumbling and trembling of the earth, which is startling indeed, especially in the night, when its greatest activity appears. Mr. Langford reported: "No water could be discovered, but we could distinctly hear it gurgling and boiling at a great distance below. Suddenly it began to rise, boiling and spluttering, and sending out huge masses of steam, causing a general stampede of our company, driving us some distance from our point of observation. When within about forty feet of the surface it became stationary, and we returned to look down upon it. It was foaming and surging at a terrible rate, occasionally emitting small jets of hot water nearly to the mouth of the orifice. All at once it seemed seized with a fearful spasm, and rose with incredible rapidity, hardly affording us time to flee to a safe distance, when it burst from the orifice with terrific momentum, rising in a column the full size of this immense aperture to the height of sixty feet; and through and out of the apex of this vast aqueous mass five or

six lesser jets or round columns of water, varying in size from six to fifteen inches in diameter, were projected to the marvellous height of two hundred and fifty feet. These lesser jets, so much higher than the main column, and shooting through it, doubtless proceed from auxiliary pipes leading into the principal orifice near the bottom, where the explosive force is greater. . . . This grand eruption continued for twenty minutes, and was the most magnificent sight we



FAN GEYSER.

ever witnessed. We were standing on the side of the geyser nearest the sun, the gleams of which filled the sparkling columns of water and spray with myriads of rainbows, whose arches were constantly changing, dipping and fluttering hither and thither, and disappearing only to be succeeded by others, again and again, amid the aqueous column, while the minute globules, into which the spent jets were diffused when falling, sparkled like a shower of diamonds; and around every shadow which the denser clouds of vapor, interrupting the su n's

rays, cast upon the column, could be seen a luminous circle, radiant with all the colors of the prism, and resembling the halo of glory represented in paintings as encircling the head of Divinity. All that we had previously witnessed seemed tame in comparison with the perfect grandeur and beauty of this display. Two of these wonderful eruptions occurred during the twenty-two hours we remained in the valley. This geyser we named the Giantess."

The Fan Geyser is very beautiful. Its eruptions are frequent, and last from ten to twenty minutes. It discharges five radiating jets to the height of sixty feet, the falling drops and spray giving the appearance of a fan. Forty feet distant, a rent discharges a great volume of vapor, rising sixty feet or more into the air, attended by loud, sharp reports. Lieutenant Doane says: —

"First the steam would rush from the upper crater, roaring violently, then this would suddenly cease, to be followed by a fan-like jet of water rising from the lower crater to the height of over forty feet, playing for perhaps two minutes; then this would suddenly stop flowing, and the steam would again rush forth for a time. Occasionally the small crater threw a transverse stream, alternating with the others; and thus they played on for hours, after which all would subside to a gentle bubbling."

Without absorbing more space on the subject of geysers, we only add, that these considered are not, perhaps, the most marvellous ones in the Park. Dr. Hayden claims that there are more than ten thousand hot springs and geysers in the Yellowstone district. The illustrations furnished give a correct idea of the characteristics of all. So that we only add a table showing the time of action of the principal geysers in the Upper Basin: —

Name of Geyser.	Interval or Period.	Duration of Eruption.	Height of Column.
1. Old Faithful .	50 to 70 minutes . .	3 to 5 minutes	75 to 150.
2. Bee Hive . . .	7 to 25 hours . . .	3 to 18 minutes . . .	200 to 219.
3. Lioness	Not known	About 3 minutes . . .	60.
4. Lion	Not known	About 5 minutes . . .	75.
5. Giantess . . .	14 days	12 hours	250.
6. Saw Mill . . .	Very frequent . . .	1¾ to 3 hours	15 to 20.
7. Grand	16 to 31 hours . .	10 to 42 minutes . . .	95 to 200.
8. Turban	About 15 minutes .	15 seconds to 5 min. .	25.
9. Castle	Once in 48 hours .	30 minutes	100.
10. Giant	Once in 4 days . .	1½ hours to 3 hours .	130 to over 200.

Name of Geyser.	Interval or Period.	Duration of Eruption.	Height of Column.
11. Young Faithful	Very frequent . . .	. . . . .	10 to 30.
12. Oblong	Once or twice daily	6 minutes	
13. Splendid . . .	About 3 hours . . .	4 to 10 minutes . . .	200.
14. Grotto	Several times a day	30 minutes	20 to 60.
15. Fan	Three times daily .	5 to 9 minutes	About 60.
16. Riverside . . .	Three times daily .	10 to 13 minutes . . .	About 60.

A tourist says of the Geyser Basin: "It looked as if it had been built up of old refuse matter from foundries; as if for centuries men had sifted ashes and thrown out clinkers and bad coal and waste stones and junk and every conceivable sort of scorched metallic thing into this chasm; and as if several apothecary shops had burnt down there too, for there was a new color and worse odor at every other step. And the little guide, striking his cane or fingers into bank after bank, kept bringing forth crumbs and powders, and offering them to us to taste or smell, with, 'Here is pure alum'; 'Here is Epsom salts'; 'Here is sulphur'; 'Here is cinnebar'; 'Here is soda,' till we felt as if we were in the wholesale drug-shop of the universe. Meantime, he skipped along from rock to rock like a chamois; and we followed on as best we might, through the hot steam, which came up hissing and fizzing out of every hole and from beneath every stone. A brook of hot water running swiftly over and among rocks; pools and cauldrons of hot water boiling and bubbling by dozens all around; black openings, most fearful of all where no water can be seen, but from which roaring jets of steam come out,— this is the bottom of the Geyser Cañon. You think you will plant your stick on the ground to steady yourself for a spring from one hot stone to another, and down goes your stick, down, down into soft, smoking, sulphurous, gravelly sand, so far and so suddenly that you almost fall on your face. You draw the stick up and out, and a small column of hot steam follows it. Next you make a misstep, and involuntarily catch hold of a projecting point of rock with one hand. You let go, as if it were fire itself. It does not absolutely blister you, but it is too hot to hold. Your foot slips an eighth of an inch out of the guide's footsteps, which you are following as carefully as if life and death depended on it, and you go in over shoes in water, so hot that you scream and think you are scalded. You are not; but if you had slipped a few inches further to right or to left, you would

have been, for on each side inky-black water is boiling so that it bubbles aloud. All this while, besides the hissing and fizzing of the steam and boiling and bubbling of the water which you see, there is a deep violoncello undertone of boiling and bubbling and hissing and fizzing of water and steam which you do not see, which are deep down under your feet, — deep down to right of you, deep down to left of you, — making the very cañon itself throb and quiver. How thick the crust may be, nobody knows. That it can be thick at all seems improbable when, prick it where you may, with ever so slender a stick, the hot steam rushes out."

A tourist remarked, after having taken in the pleasures of the Yellowstone, "See Yellowstone Park, and die!" It is very foolish advice; for the man who has beheld its marvels ought to desire to live all the more, to glorify the Great Architect, who builds so grandly even where the wild beast only dwells. Looking "through Nature up to Nature's God" can be done easily in this "Wonderland," and the overwhelming influence may help one to live better all his life. See Yellowstone Park, and LIVE! is better counsel for the human race. All of its impressions are grand and ennobling in the highest degree, — just the inspiring elements which lift the soul into honor, and beget lofty aims.

YOSEMITE VALLEY.

The marvels of the Yosemite Valley stand pre-eminent among the wonders of the New West. Europeans who have explored this valley are surprised that Americans should go abroad to enjoy Alpine scenery, when California can introduce them to grander sights.

The Yosemite Valley was not visited by a white man until 1850. Then, two adventurers penetrated it in search of gold mines; and the Indians, who held possession of all that region, murdered them. It is only thirty-six years (1855) since a party of tourists entered the valley. Since then, writers and painters from all parts of the world have explored it, to tell of its marvels to astonished nations.

In 1857 Yosemite was formally opened to the public; and in 1864 it was set apart forever as a national park. It is situated one hundred and fifty miles east of San Francisco, about midway of the State from north to south. Formerly it was quite difficult of access, but now it can be easily reached. A tourist writes of this valley of enchantment as follows: —

"The Yosemite! As well interpret God in thirty-nine articles as

portray it to you by word of mouth or pen. As well reproduce castle or cathedral by a stolen frieze or broken column as this assemblage of natural wonder and beauty by photograph or painting. The overpowering sense of the sublime, of awful desolation, of transcending marvellousness and unexpectedness, that swept over us, as we reined our horses sharply out of green forests, and stood upon the high jutting rock that overlooked this rolling, upheaving sea of granite mountains, holding far down its rough lap this vale of beauty of meadow and grove and river, — such tide of feeling, such stoppage of ordinary emotions, comes at rare intervals in any life. It was the confrontal of God face to face, as in great danger, in solemn, sudden death. It was Niagara magnified. All that was mortal shrank back; all that was immortal swept to the front and bent down in awe. We sat till the rich elements of beauty came out of the majesty and the desolation, and then, eager to get nearer, pressed tired horses down the steep, rough path into the valley.

"And here we wandered and wondered and worshipped for four days. Under sunshine and shadow; by rich, mellow moonlight; by stars opening double wide their eager eyes; through a peculiar August haze, delicate, glowing, creamy, yet hardly perceptible as a distinct element, — the New England Indian summer haze doubly refined, — by morning and evening twilight, across camp-fires, up from beds upon the ground through all the watches of the night, have we seen this, the great natural wonder of our western world. Indeed, it is not too much to say that no so limited space in all the known world offers such majestic and impressive beauty. Niagara alone divides honors with it in America. Only the whole of Switzerland can surpass it; no one scene in all the Alps can match this so vividly before me now in the things that mark the memory and impress all the senses for beauty and for sublimity."

"Yosemite" is a chasm rather than a valley; averaging one-half mile in width, and from six to eight miles in length, completely surrounded by a perpendicular granite wall from a half-mile to a mile in height. At "Inspiration Point" the wonders of the valley burst upon the view. If the tourist's head is level, he can look straight down five thousand feet.

"Cathedral Rock" lifts its peak high into the air, and stands out prominently in the grand panorama. The "Rock" is two thousand six hundred and eighty feet high, and its loftiest peak rises five hundred feet higher, its magnificent proportions presenting a scene of surprising grandeur. Six Washington monuments, one upon another,

scarcely cover the height of these tremendous "Rocks." The writer just quoted says: —

"Here and there are grand massive domes, as perfect in shape as Boston's state-house dome, and bigger than the entire of a dozen state-houses. The highest rock of the valley is a perfect half-dome,

CATHEDRAL ROCK.

split sharp and square in the middle, and rising near a mile (or five thousand feet), — as high as Mount Washington is above the level of the sea, — over the little lake which perfectly mirrors its majestic form at its foot. Perfect pyramids take their places in the wall; then these pyramids come in families, and mount away one after and above the other, as 'The Three Brothers.' 'The Cathedral Rocks' and 'The Cathedral Spires' unite the great impressiveness, the

EL CAPITAN.

beauty, and the fantastic forms of the gothic architecture. From their shape and color alike, it is easy to imagine, in looking upon them, that you are under the ruins of an old gothic cathedral, to which those of Cologne and Milan are but baby-houses."

BRIDAL VEIL FALL.

Stupendous as "Cathedral Rock" is, "El Capitan" is still more massive and imposing. It is three thousand three hundred feet high, aud projects squarely out into the valley, rising vertically. Not a sprig or spear of vegetation appears upon its sides, only bare, rugged granite. It is difficult to appreciate the size of this rock; but some idea of its dimensions may be acquired from the fact, that, in a clear

day, it can be seen from San Joaquin plains, from fifty to sixty miles away. A writer says: —

"You descend by a zigzag trail to the valley. It seems like descending into a grave. You feel imprisoned, for all about there is no exit except over the precipitous sides. You are four thousand feet above the sea, and nearly a mile below the surrounding mountains, which environ this sombre valley. The trees look stunted. They are two hundred feet high. The mere ribbon, the Bridal Veil Falls, is found quite a torrent, and from the new view seems a single fall of nine hundred feet. El Capitan, half-mile away, you think you can hit with a pebble. Grasp its height! It is giant masonry most matchless, and for clean-cut bulk is without example. If it toppled over, one hundred and sixty acres would be covered by the prostrate mass. It is as lofty as the heaped-up spires of twelve Trinity churches. St. Peter's is four hundred and forty-eight feet high. It would take eight to gain the altitude of El Capitan's crest. The topmost pinnacle of Strasburg Cathedral glitters in the sun four hundred and sixty-eight feet above its foundation walls. It is less than one-seventh as high as El Capitan."

Bridal Veil Fall can be seen so far away that it appears like a mere ribbon. On approaching it, however, it becomes a torrent tumbling six hundred and thirty feet at the first leap, continuing three hundred feet more in beautiful cascades. On the other side of the valley, directly opposite, "The Virgin's Tears Creek" makes a fall of one thousand feet. But this fall, unlike the Bridal Veil, is in operation only a portion of the year, as the Creek dries up early in the season. In volume of water, height of fall, beauty, and grandeur, it is far superior to the celebrated "Stanbach" of Switzerland; and yet it is hardly noticed by travellers in the Yosemite Valley because there are so many grander ones. Bentley, who has seen the Bridal Veil, with its majestic surroundings, at night, says: —

"Thousands of travellers and tourists make pilgrimage to it each year, and yet no pen, brush, camera, nor tongue has ever, nor ever can, describe it in all its variety of grandeur and interest, so satisfactorily as it reveals itself to the visitor. Who can paint its dark and ever-changing shadows, sweetly nestling under those grim and awe-inspiring walls? Who can write the sweet, yet dream-like story of its cascades, falls, and deep, crystal pools, among those cliffs and rock-ribbed, sky-piercing gray giants, or set to music the plaintive cadence of the summer wind through those proud pines and firs? Can you trip to step so fairy as yon meadow brook delights itself

among its bordering grass and trailing sedge, or laugh as it, as bounding o'er each rocky ledge? Did ever mirror give back beauty's smile

YOSEMITE FALLS.

as *that* mirror lake, or make grim mountain peak more grim? Where does early morning linger more lovingly, or evening shade more grateful seem? Oh, where does night seem more solemn than in

Yosemite? The roaring cataract, the foamy flutter of the 'Bridal Veil,' gleaming like a silver band in the soft moonlight, yon lamps of heaven glossed over by fleecy clouds, half secreting, now half disclosing, the tender murmur of balsam-freighted night wind; gurgling brooklet, and shrill alarm of owl or dove, are of the legion of voices in which kind nature salutes you in this valley of the valleys, Yosemite!"

Niagara's descent is only one hundred and sixty feet; that of Yosemite is two thousand six hundred and thirty-four. Sixteen Niagaras added together only equal the stupendous plunge of Yosemite Falls. It is the grandest waterfall in the whole world, when the volume of water which it pours is estimated. Bentley's "Handbook" says:—

"The Yosemite Fall is produced by a creek of the same name, which heads on the west side of the Mount Hoffman Group about ten miles northeast of the valley. Being fed by melting snows exclusively, and running through its whole course over almost bare granite rock, its volume varies greatly at different times and seasons, according to the amount of snow remaining unmelted, the temperature of the air, and the clearness or cloudiness of the weather. In the spring, when the snow first begins to melt with rapidity, the volume of water is very great; as ordinarily seen by visitors in the most favorable portion of the season — say from May to July — the quantity will be less; still later, it shrinks down to a very much smaller volume. The vertical height of the lip of the fall, above the valley, is, in round numbers, two thousand six hundred feet. The lip or edge of the fall is a great rounded mass of granite, polished to the last degree, on which it was found to be a very hazardous matter to move. The fall is not in one perpendicular sheet; there is first a vertical descent of one thousand five hundred feet, when the water strikes on what seems to be a projecting ledge, but which, in reality, is a shelf or recess, almost a third of a mile back from the front of the lower portion of the cliff. From here the water finds its way, in a series of cascades, down a descent equal to six hundred and twenty-five feet perpendicular, and then gives one plunge of about four hundred feet on to a low *talus* of rocks at the base of the precipice. The whole arrangement and succession of the different parts of the fall can be easily understood by ascending to the base of the Upper Fall, which is a very interesting and not a difficult climb, or from Sentinel Dome, on the opposite side of the valley, where the spectator is at a considerable distance (two and a half miles) above its edge.

As the various portions of the fall are nearly in one vertical plane, the effect of the whole is nearly as grand, and perhaps even more picturesque, than it would be if the descent were made in one leap from the top of the cliff to the level of the valley. Nor is the grandeur or beauty of the fall perceptibly diminished by even a very considerable diminution of the quantity of water from its highest stage."

Bentley says: "The Nevada Fall is, in every respect, one of the grandest waterfalls in the world, whether we consider its vertical height, the purity and volume of the river which forms it, or the stupendous scenery by which it is environed. The fall is not quite perpendicular, as there is, near the summit, a ledge of rock which receives a portion of the water and throws it off with a peculiar twist, adding considerably to the general picturesque effect. A determination of the height of the fall was not easy, on account of the blinding spray at the bottom, and the uncertainty of the exact spot where the water strikes. Indeed, this seems to vary in the Nevada as well, although not so much as in the Vernal Fall. To call the Vernal four hundred and the Nevada one hundred feet, in round numbers, will be near enough to the truth. The descent of the river in the rapids, between the two falls, is nearly three hundred feet. Within the valley are other wonderful falls, other stupendous cliffs, overtopped by lofty cloud-capped mountains behind whose rocky shoulders slumber great fields of snow; while around are the highest mountain peaks within the United States, a vast panorama of mountains, dark-wooded valleys and smiling landscapes, everywhere."

LIBERTY CAP.

The towering dome seen beyond the brink of the fall is "Liberty Cap," in itself an object of surpassing interest in the Yosemite. Its summit is two thousand feet higher than the fall, five thousand feet above the valley below, and nine thousand above the level of the sea.

The "Fall" and "Liberty Cap" together create a scene over which painter and poet become surcharged with enthusiasm.

Sentinel Rock is shaped somewhat like an obelisk, its striking resemblance to a watch-tower suggesting its name. The obelisk form continues down one thousand feet from its summit; and below that point it unites with the wall of the valley. Its height above the

SENTINEL ROCK.

river is three thousand and forty-three feet, — one of the most majestic masses of rock in the Yosemite Valley.

The illustration locates the Hotel Leidigs on a beautiful spot which the towering sentinel overlooks from its lofty altitude.

Ludlow, in his "Heart of the Continent," discusses the process of formation of these quaint obelisks as follows: —

"I ascended one of the most practicable hills among the number

crowned by sculpturesque formations. The hill was a mere mass of sand and débris from decayed rocks, about a hundred feet high, conical, and bearing on its summit an irregular group of pillars. After a protracted examination, I found the formation to consist of a peculiar friable conglomerate, which has no precise parallel in any of the eastern strata. Some of the pillars were nearly cylindrical, others were long cones, and a number were spindle-shaped, or like a buoy set on end. With hardly an exception, they were surmounted by capitals of remarkable projection beyond their base. These I found slightly different in composition from the shafts. The conglomerate of the latter was an irregular mixture of fragments from all the hypogene rocks of the range, including quartzose pebbles, pure crystals of silex, various crytalline sandstones, gneiss, solitary hornblende and feldspar, nodular ironstones, rude agates and gun-flint, the whole loosely cemented in a matrix composed of clay lime (most likely from the decomposition of gypsum) and red oxide of iron. The disk which formed the largely projecting capital seemed to represent the original diameter of the pillar, and apparently retained its proportions in virtue of a much closer texture and larger per cent of iron in its composition. These were often so apparent that the pillars had a contour of the most rugged description, and a tinge of pale cream yellow, while the capitals were of a brick-dust color, with excess of red oxide, and nearly as uniform in their granulation as fine millstone-grit. The shape of these formations seemed, therefore, to turn on the comparative resistance to atmospheric influences possessed by their various parts. Many other indications led me to reason down all the hypothetical agencies which might have produced them, to a single one — *air*, in its chemical and mechanical operations, and usually in both. . . . One characteristic of the Rocky Mountains is the system of vast indentations, cutting through from the top to the bottom of the range. Some of these take the form of funnels, others are deep, tortuous galleries, known as passes, or cañons; but all have their openings towards the plains. The descending masses of air fall into these funnels or sinuous canals, as they slide down, concentrating themselves and acquiring a vertical motion. When they issue from the mouth of the gorge at the base of the range, they are gigantic augers, with a revolution faster than man's cunningest machinery, and a cutting-edge of silex obtained from the first sand-heap caught up by their fury. Thus armed with their own resistless motion, and an incisive thread of the hardest mineral next to the diamond, they

sweep on over the plains to excavate, pull down, or carve in new forms, whatever friable formation lies in their way."

Although the marvels of Yosemite fill us with wonder, California has yet other sights equally novel. Her "BIG TREES" must be classed with the wonders of the world. A journey from Maine to California to see them alone is honored with interest by the sight. Trees four hundred and fifty feet high, and forty feet in diameter, must be catalogued with first-class marvels. They were discovered in 1852, and, soon after, the hollow trunk of one was forwarded to New York City, where it was converted into a grocery store. We furnish (p. 95) an illustration of one of these giants of the forest. It is no great matter that a stage line can find ample room at the base of its trunk, occupying only a fractional part of its diameter; for the tallest load of hay may be driven through the hollow trunk of one of these trees, thirty feet in diameter, if prostrate.

SECTION OF A BIG TREE.

The "Hotel de Redwood" was originally five hollow trees; one devoted to office and bar-room, another to quarters for the proprietor's family, and dining-room, and the remainder to lodgings, etc.

"The New West" contains a very interesting account of these trees, from which we make the following extracts: —

"They were discovered in 1852 and named by Endlicher, in honor of an Indian chief of the Cherokees. They are limited in range,

being confined to California, and grow entirely in groups. Of these groups there are eight, or nine if the Mariposa be considered as two. Taking these groups from north to south the Calaveras comes first, then the Stanislaus, Crane Flat, Mariposa, Fresno, King's and Keweah rivers, North Fork of the Tule River and South Fork of Tule River.

"The Calaveras group is in the county of the same name, near the crossing of the Sierras by Silver Mountain Pass. The belt of trees is three thousand two hundred by seven hundred feet, and in that space are ninety-two of the monarchs. The most notable being the following: —

	Height.	Circumference.
Father of the Forest	435 feet	110 feet
Mother of the Forest	321 "	90 "
Hercules	320 "	95 "
Hermit	318 "	60 "
Pride of the Forest	276 "	60 "
Three Graces	295 "	92 "
Husband and Wife	252 "	60 "
Burnt Tree	330 f'l'g.	97 "
Old Maid	. . .	. . .
Old Bachelor	. . .	. . .
Siamese Twins	. . .	. . .
Mother and Sons	. . .	. . .
Two Guardians	. . .	. . .

"Here under the shade is one of California's pet retreats. There is one fallen monster, which must have stood four hundred and fifty feet in the air and had a diameter of forty feet. Another engaged the efforts of five men for twenty-five days in cutting, and on the level surface of the stump thirty-two dancers find ample room. Old Goliah shows the marks of a fire, that, according to surrounding trees untouched, must have raged a thousand years ago.

"The diameter of the largest is thirty-three feet; the circumference of the largest, five feet above the ground, sixty-one feet. This is the only one more than sixty feet in circumference.

"The Stanislaus group, five miles distant, contains seven or eight hundred trees nearly as remarkable. Crane Flat has those boasting a diameter of twenty-three feet, and circumference of fifty-seven feet. The Mariposa group, which generally divides honors with Calaveras, is situated sixteen miles south of the Lower Hotel in Yosemite. A trip to Yosemite is incomplete unless it includes a visit to both of them.

STAGE LINE.

"The same wise foresight which gave Yosemite to the State, gave Mariposa to be held in perpetuity. The grant is two miles square. It has been improved and made of easy access. The Tule River Groups were the last discovered, being found in 1867. While Calaveras and Mariposa lead in point of being known, the others are worthy any reasonable expenditure of time and money.

"Gazing on a mountain there comes no thought that it has been a witness to the passing events of the ages. But these trees have shaded races dead for hundreds of years. They live, and seem almost possessed of minds; and when those who now rest under their branches are dust, they will still live, and future generations may conjecture who has seen them in ages gone. They sprouted before the Christian era dawned, and unconcerned they grew, while nations rose and fell. Who knows what may transpire till when the earth shall tremble to their crash-

ing fall? Or how long shall their fluted Corinthian columns sway grandly to the winds of the Pacific?"

That a pioneer should set up housekeeping in the hollow trunk of one of these big trees is not at all strange, for he has an ample tenement there without the trouble of lathing and plastering. A hollow tree, from thirty to forty feet in diameter, may be partitioned into several comfortable rooms — space enough for quite a numerous family.

We conclude our remarks upon these giants of the forest by an extract from the pen of one who has sat beneath their shadows: —

PIONEER CABIN.

"Wild calculations have been made of the ages of the larger of these trees; but one of the oldest in the Calaveras Grove being cut down and the rings of the wood counted, its age proved to be one thousand three hundred years; and probably none now upon the ground date back farther than the Christian era. They began with our modern civilization; they were just sprouting when the Star of Bethlehem rose and stood for a sign of its origin; they have been ripening in beauty and power through these nineteen centuries; and they stand forth now, a type of the majesty and grace of Him with whose life they are coeval. Certainly they are chief among the natural curiosities and marvels of Western America, of the known world; and though not to be compared, in the impressions they make and the emotions they arouse, to the great rock scenery of the Yosemite, which inevitably carries the spectator up to the Infinite Creator and Father of all, they do stand for all that has been claimed for them in wonderful greatness and majestic beauty."

"Trees of God!" remarked a European tourist.

Professor Whitney presents the following table of measurements of height and circumference of a number of the trees in the Mariposa Grove: —

No.	Height.	Circumference at Ground.	Circumference Six Feet Above Ground.	Remarks.
12	244	62.	...	Very fine symmetrical tree.
15	272	...	...	Fine, sound tree.
16	...	86.5	...	Thirty-one feet in diameter; hollow.
20	...	72.5	55.	Fine tree.
21	...	...	44.	Very fine tree; not swollen at base.
27	250	48.		
29	...	89.8		
31	186	35.7	29.6	Very straight and symmetrical.
35	...	65.	50.8	
38	226	27.		
49	194			
51	218	56.	39.	Very fine tree.
52	249	...	40.	Fine tree.
60	...	81.6	59.	Very fine tree, but burned at base.
64	...	82.4	50.	Very fine tree.
66	221	39.8		
69	219	35.7		
70	225	43.9		
77	197	...	27.8	
102	225	...	50.	Very fine tree.
158	223			
164	243	...	27.6	
169	...	79.6	...	Much burned at base.
171	...	82.7	...	Badly burned on one side.
174	268	...	40.8	
194	192	...	46.	Two trees united at base.
205	229	87.8	...	Much burned on one side; formerly over one hundred feet in circumference.
206	235	70.4		
216	...	...	63.2	Very large tree; much burned at base.
226	219	...	48.	Fine tree.
236	256	..	46.	
238	...	...	57.	Twenty-six feet in diameter; burned on one side.
239	187	...	26.6	
245	270	81.6	67.2	Burned on one side.

No.	Height.	Circumference at Ground.	Circumference Six Feet Above Ground.	Remarks.
253	...	74.3	60.	
262	...	56.	...	Half burned at base.
275	...	68.		
286	...	76.	...	Burned on one side nearly to centre.
290	...	...	46.	
301	...	...	51.	
304	260	93.7	...	Largest tree in the grove; twenty-seven feet in diameter, but all burned away on one side.
330	...	91.6	...	Splendid tree; over one hundred feet in circumference originally, but much burned at base.
348	227	...	51.	

THE GARDEN OF THE GODS.

"Have you been to the Garden of the Gods?" This is a stereotyped question in Colorado. The "Garden" occupies a place so prominent in the public estimation, that a visit to it must not be long delayed. He who fails to see it might as well fail to see the New West, many would say. It surely is a place of transcendent interest; and is one of the marvels that will live long in the memory.

The "Garden" is five miles from Colorado Springs, and about seventy-five miles from Denver. It is reached from the springs by what is known as Mesa road. For a mile or more the road ascends the high tableland, when for three miles it crosses the almost level summit, from which the "Beautiful Gate" of the "Garden" is seen, and then descends ten or fifteen hundred feet into Camp Creek Valley. One mile further, along a lovely stream, and the tourist finds himself in front of the gate.

It is not a gate of human workmanship. There is an air of the artificial about it, because the massive portals seem to have been carved; but the workmanship is all divine. The plan, too, is divine. The pillars of the gate, on either side, composed of red sandstone, are three hundred and eighty feet high, — too high for any one but the Great Architect to think of rearing. A beholder adds, without

the least extravagance, "There is another parapet of white stone, and inner columns of various colors, which might well be the ruins of a vast heathen temple, or the shrine of the long-buried gods. The impression produced by the 'Garden of the Gods' varies greatly with the time of day and the climatic conditions under which it is seen. Immediately after rain its hues are deeper, and it becomes so vividly red that an exact representation of it would be scouted at once as a distorted vision of the painter. In the soft light of evening a sagy green of exquisite delicacy suffuses itself over the vegetation from which the rocks in all directions rise; while the last rays of

GATEWAY TO THE GARDEN OF THE GODS.

the departing sun cause the enormous tablets of stone to flash out with surpassing grandeur. As a rule, to see the garden to the best effect it should be approached from Colorado Springs in the morning and from Manitou at eventime. If possible, it should be visited at both times, and also by moonlight, when the colors die away, and strange and almost unearthly forms take their place."

Entering the portals, with Pike's Peak looming up in front, and objects of the strangest and most fantastic forms appearing on every hand, the thoughtful visitor is disposed to uncover his head as if in the presence of the Wise Builder of this natural amphitheatre.

"See there!" said our guide, pointing to a towering rock three or four hundred feet high, "the bear and seal; the bear taking his

ease, and the seal crawling up to keep him company." And, sure enough, there was the menagerie on exhibition far above us, the two aforesaid animals, in stone, appearing to be as perfect in form as if carved by human hands.

"And there is one of our 'boys in blue,'" continued our guide, pointing in another direction. "See that soldier yonder?" It required no aid of the imagination to discover the soldier in a sitting posture, as far up towards the sky as the seal and bear. Further on, seeing a hideous-looking creature in rock, we asked: "That monster yonder, — what do you call him?" The image was nearly as big as Jumbo, sitting upon his haunches, minus fore paws, but possessing a mammoth mouth, wide open, as if to gulp down the passer-by, and the large eyes staring at us in hot anger. "There is no name for that, so far as I know," was the answer. "Then call it *No Name*," we replied; "that would be appropriate. It is said that tourists have given names to all these objects which are named, so we will dub this nameless creature, No NAME." We had scarcely ceased discussing this last strange uncouth object, when it was announced, "Here comes grandmother." Turning to the right, we beheld a good imitation of an old woman, not wearing a particularly pleasant countenance, nor apparelled exactly according to the fashion of the times, but, nevertheless, about as good an imitation of an Indian grandmother, with a pappoose on her back, as the average sculptor can carve in stone.

BEAR AND SEAL.

We may add here a paragraph from Dr. Mary E. Blake, who described her feelings after entering "within the gate." "The impression is of something mighty, unreal, and supernatural. Of the gods surely — but the gods of the Norse Walhalla in some of their

strange outbursts of wild rage or uncouth playfulness. The beauty-loving divinities of Greece and Rome could have nothing in common with such sublime awkwardness. Jove's ambrosial curls must shake in another Olympia than this. Weird and grotesque, but solemn and awful at the same time, as if one stood on the confines of another world and soon the veil would be rent which divided them. Words are worse than useless to describe such a picture. Perhaps if one could live in the shadow of its savage grandeur for months, until his soul were permeated, language would begin to find itself flowing in proper channels, but in the first stupor of astonishment one must only hold his breath."

THE GRANDMOTHER.

Says another (H. H.) of the general appearance of things in this weird place: —

"You wind among rocks of every conceivable and inconceivable shape and size, from pebbles up to gigantic bowlders, from queer, grotesque little monstrosities, looking like seals, fishes, cats, or masks, up to colossal monstrosities, looking like elephants, like huge gargoyles, like giants, like sphinxes eighty feet high, all bright red, all motionless and silent, with a strange look of having been just stopped and held back in the very climax of some supernatural catastrophe. The stillness, the absence of living things, the preponderance of grotesque shapes, the expression of arrested action, give to the whole place, in spite of its glory of coloring, spite of the grandeur of its vistas ending in snow-covered peaks only six miles away, spite of its friendly and familiar cedars and pines, spite of an occasional fragrance of clematis, or smile of a daisy, or twitter of a sparrow, — spite of all these, a certain uncanniness of atmosphere, which is at first oppressive. I doubt if one ever loved the Garden of the Gods at first sight. One must feel his way to its beauty and rareness,

must learn it like a new language; even if one has known nature's tongues well, he will be a helpless foreigner here."

We quote again from Dr. Blake: —

"Strange, grotesque shapes, mammoth caricatures of animals, clamber, or crouch, or spring, from vantage points hundreds of feet in air. Here a battlemented wall is pierced by a round window; there a cluster of slender spires lift themselves; beyond, a leaning tower slants through the blue air, or a cube as large as a dwelling-house is balanced on a pivot-like point at the base, as if a child's strength could upset it. 'But nothing short of an earthquake could fetch it,' says the 'Doc,' our driver, a fine specimen of the western type, keen, cool and ruddy. Imagine all this scintillant with color, set under a dazzling sapphire dome, with the silver stems and delicate frondage of young cotton-woods in one space, a strong young hemlock lifting green symmetrical arms from some high rocky cleft in another, or a miniature forest of dwarfed evergreens climbing half way up some craggy pile. This can be told, but the massiveness of sky-piled masonry, the almost infernal mixture of grandeur and grotesqueness, are beyond expression. After the first few moments of wild exclamation points one sinks into an awed silence."

BALANCE ROCK.

Dr. Blake referred to a rock on a pivot, probably meaning "Balance Rock," as seen in the cut. It is a huge affair, and yet appears to be so delicately balanced that a child might rock it. On trial, however, it is found to be immovable — a very ponderous thing, defying all attempts to move it. Quite an exact profile of "the human face divine" is seen on one side of this rock — eyes, nose, and mouth very properly adjusted, while the chin is elongated into almost too much of a good thing. The top of the head does not exactly tally with the chart of the phrenologist, but it is quite in harmony with the oddities and queer objects scattered about.

Dr. B. F. Taylor expressed himself very graphically over the strange and fantastic objects in this garden, as follows: —

"Here is a park of five hundred acres of land, mountain-locked on the north and west, moated with cañons on the south, and walled with red sandstone on the east, spread with grassy carpets here and there, and dotted with little pines and other vegetable stragglers. You approach a gateway two hundred feet wide, with red sandstone towers over three hundred feet high, covered with sculptures that no man can read, and massive and rugged as are no other portals in the world.

"In the centre of the way is a red pillar twenty-five feet high, which was probably the horse-block whence the Titonesses stepped to the pillions behind their lords and masters when they went their morning rides. You can see the walled-up windows whence the old warders looked forth. You can see escutcheons that no herald can make out; chimneys standing alone; towers dismantled; alcoves, broken arches, pinnacles, castle ruins, and all red as porphyry. And a little way off you see parallel walls that are marble white, and show in fine contrast with the cinnabar tints around.

"Not long ago I saw photographs of the ruins of Ba'albek, and I said, A greater than Ba'albek is here; these Titanic castles and fortresses wrecked and ruined, and greater in their destruction than the complete architecture of the Wrens and Walters of modern times. Anybody can rear castles from foundation to turret, but only one architect can build ruins so grand, and his name is Upheaval.

"Think of a multitude of stone toad-stools, six, ten, twelve feet in diameter; of Chinamen's hats done in pink, yellow, red, with mossy rosettes; of awkward sun-bonnets weighing two tons apiece, always slipping off and never falling; of stone bowls, big as cauldron kettles, bottom side upon pillars; of ogreish heads wrapped about with gray turbans; of loaves of overdone bread, two hundred pounds apiece, set upon the rocks to cool; of a crop of capped and hooded gateposts waiting to be harvested; of petrified dumb-bells such as Jupiter might have practised with before throwing his thunderbolts; of a flock of witches in red tatters squatting around in dumb petrifaction; of masses of rock as big as a house poised upon stones the size of a pumpkin; of whole families of Leaning Towers — no end of Pisas — accenting everything in a manner more emphatic than delightful; think of all these at once, and you will know something of this sandstone nightmare."

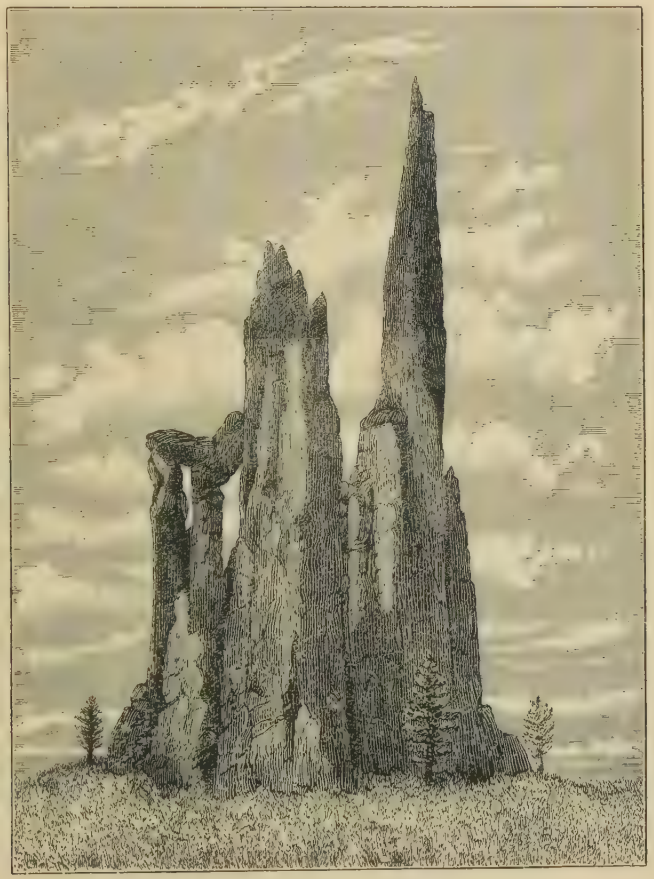
Here is a natural curiosity — a hole in the rock, through which a good view of Pike's Peak may be enjoyed. Dr. Blake calls it "a window in a rock." It furnishes an interesting study for geological explorers, as well as amusement for speculating tourists. Differing as it does from the other marvels of the garden discussed, it shows that the collection which nature has made in this locality for the entertainment of astonished travellers has a wide range.

We have spoken of the action of water in forming such stone marvels as we have described. Prof. J. T. Edwards, speaking of "water as an architect," says:—

WINDOW IN A ROCK.

"In the divine hand water has been used as the material with which to shape the earth, even as a workman employs his files, emery, and diamond dust to shape the objects upon which he labors. At first the earth was characterized by one dead level — a wide, desolate, fire-scarred plain; then the mountains were upheaved, the depths were broken up, and, no longer resting in their quiet beds, everywhere rolled down the slopes, and by mere attrition, wore away the firm rocks and bore the material into the plains below; all valleys have thus been made. Some are still in process of formation. Far out in the Gulf of Mexico, and in the Indian Ocean, the Mississippi and the Ganges are pouring their sediment and building future continents. Sometimes, where the volume of water was great, or the mountains steep, mighty gorges were carved out, like the river-bed below Niagara, the tremendous cuts of the Congo, or the awful

cañons of the Colorado, some of which are five thousand feet in depth. Ceaseless waves beat upon the shore, powdered the rocks, and made the soft beaches; tides ebbed and flowed, and slowly wrought their changes. In addition to the *wearing* action of the water, which arises from the smoothness of its molecules, and the



CATHEDRAL SPIRES.

slight cohesion of its particles, thereby causing ceaseless motion, it possesses a wonderful solvent power. Solution arises from the fact that the adhesion between a liquid and a solid is greater than the cohesion between the molecules of the solid; whenever this is the case, the latter will be dissolved. If water is heated, this action will be intensified; such was its condition in the early geologic ages, and this explains the extraordinary rapidity with which rocks were then

dissolved. Beautiful grottoes were formed like that of Antiparos, vast caverns, such as those along the coasts of Scotland, the Mammoth Cave of Kentucky, and the Wyandotte of Indiana. It is a curious paradox which appears in this story of world-building, that the New World was really the oldest in process of formation, and that the tallest mountains were the latest upheaved."

"Cathedral Spires," like the cut opposite, are found, not only in the Garden of the Gods, but throughout this locality. They resemble the spires of churches; hence the name.

A few only of the many remarkable and curious things to be seen in the Garden of the Gods can be furnished in our limited space. Enough, however, are furnished to show that, all in all, the place was rightly named. From the point of entrance to that of exit, the tourist finds it difficult to dispel the thought that human ingenuity has gotten up this remarkable exhibition of statuary and architecture for the delight of travellers. But then he reflects quickly that DIVINE ingenuity will beat the human every time; and he finds that every word of Colorado's reliable historian, Frank Fossett, is strictly verified: —

"The Garden of the Gods, so named from the grotesque and gigantic rocks of red and white sandstone thrown into all manner of fantastic shapes, and worn by the elements, constitutes one of the State's greatest natural wonders. These rocks are scattered in picturesque confusion from the enormous portal of the enclosure to the lofty crags that rise on either hand. Some of these giant pillars and cathedral-shaped towers are hundreds of feet in height, and altogether form a scene at once weird and enchanting."

MONUMENT PARK.

"Monument Park," so-called, in its location and general features, belongs to the class of wonders under consideration. It is situated a few miles to the north of the Garden of the Gods, and is annually visited by thousands of sight-seers. While it is not invested with the interest and singularities which have made the latter place so renowned, it nevertheless has much in common with that museum of marvels, as the several illustrations we furnish abundantly prove.

These monuments are from five or six feet to a hundred feet in height, and are numerous. A geologist says: —

"They belong to the cretaceous group of rocks. They consist of columns of soft, white chalk conglomerate, capped with a hard ferru-

ginous ore. The action of the elements for the countless ages of the past has carved out these monuments, towers, and ruins for the wonders of the present day."

This writer claims that there are "no greater geological wonders and curiosities on the continent" than Monument Park contains.

On Line of D. & R. G. Railway. MONUMENT PARK.

This park is more distinguished for monumental piles than for grotesque figures. Speaking of the latter recalls an amusing incident that might be narrated here as well as any place. A tourist was stopping at a hotel in Colorado Springs, and one day he visited Austin's Bluff, a few miles distant. Near that place he discovered a rock-rooster, as perfect, he thought, as a sculptor could make; and

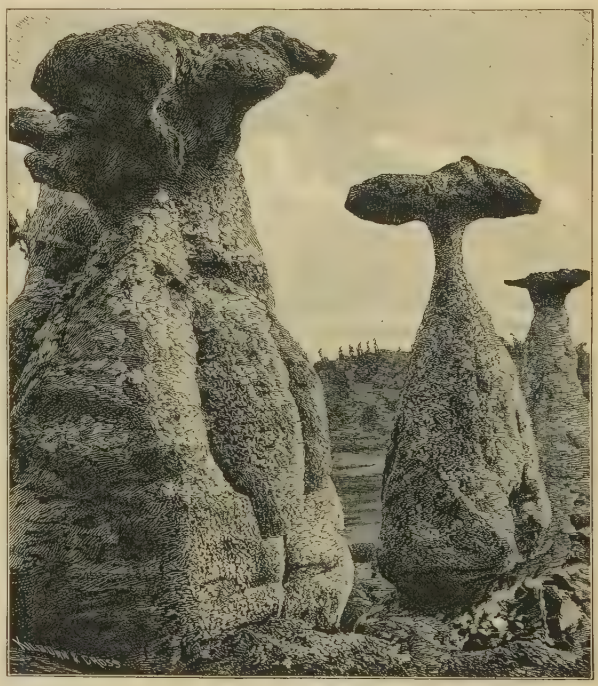
he bore it away in triumph, congratulating himself upon his fortunate discovery. On reaching the hotel, and exhibiting his trophy, he was rather dumbfounded by the bit of information, —

"Why, that is private property. The owner set it up by the wayside for the entertainment of travellers."

"Is that so!" exclaimed the tourist. "Then I must carry it back."

"Of course you must. Mr. Austin's gardener put the rooster on exhibition there. No wonder that you were surprised to find so good an imitation of a rooster in stone up there."

The tourist made haste to restore the silent rooster to his place on the rocks; but thereafter he was often humorously reminded of his stone trophy. The traveller just quoted says: —



GROUP OF MONUMENTS.

"Twelve miles northward of Colorado Springs is a group of beautiful small valleys known as Monument Park, from the great number of these strange sandstone rocks. It is the liveliest of all lonely places. You drive over a grassy road in the middle of a narrow green meadow, the sides of which slope up like the sides of a trough, the narrow strip of meadow ending abruptly at the base of high yellow sandstone cliffs, covered with pines, firs, and low oak shrubs. There are frequent breaks in these cliffs, and passes through them; and so crowded are these passes and cliff-sides with the yellow stone columns, that it is not at all hard to fancy that they are figures winding in and out in a procession, mounting guard, lying down, sunning themselves, leading or embracing each other. Perverse people, with fancies of a realistic order, have given

names to many of these figures and groups: 'The Anvil,' 'The Quaker Wedding,' 'Dunces' Parliament,' 'Priest and Nun,' 'The Duchess,' etc., etc. Photographers, still more perverse, have persisted in photographing single rocks, or isolated groups, with neither background nor foreground. These are to be seen everywhere, labelled, 'Rocks in Monument Park,' and are admirably calculated to repel people from going to what would be some bare, outlying pinnacle of the universe, on which imps had played at making clay figures, with high stakes for the ugliest. A true picture of Monument Park would give a background of soft yellow and white sandstone cliffs, rounded, fluted, and grooved, with waving pines thick on the top, and scattering down the sides, and the statue-like rocks half in and half out among the trees; and to make the picture perfect, it should be given looking west, so that the green valley, with its fantastic yellow side walls and statues should be shut across at the further end by a high mountain range, dark blue against a shining sky."

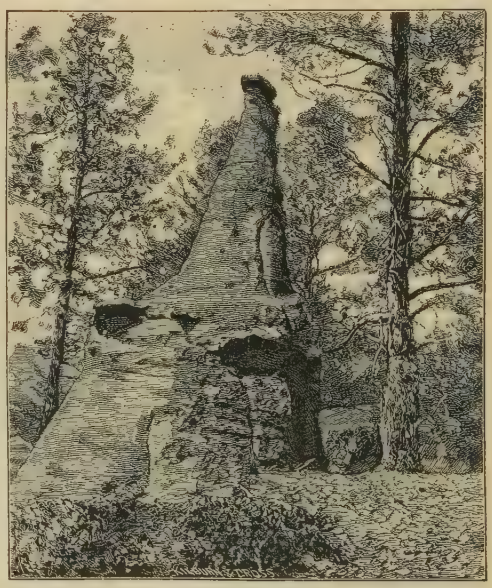
THE SENTINEL.

This monument stands alone in the midst of trees and shrubs, between which there exists a seeming companionship. It is larger at the top than it is at the base, and its whole appearance is suggestive of a sentinel; not like the sentinel who paces over his beat, back and forth, in monotonous measure, but rather like the Roman sentinel who stood at the gate of his city, where he was found a thousand years after the eruption of Vesuvius had buried its inhabitants under molten lava, his skeleton hand still grasping the golden hilt of his sword, and his attitude and appearance indicating the faithful sentinel. So stands this rock. Thus it has stood, no one but God can tell how long.

Perhaps there is no sample of natural statuary in all this region more remarkable than what some have been pleased to call "The

Duchess." Royal as well as delicate in appearance, it is certainly a marvel of the highest class, inviting not only admiration but study as well.

The reader must admit that no traveller quoted has been extravagant in his description of the Garden of the Gods and Monument Park. The illustrations furnished are quite sufficient to show that nature has provided very remarkable collections of natural objects in these localities. If any of the writers have allowed the imagination to give peculiar coloring to their descriptions, it has been only the inspiration of the place and occasion. He must possess an exceeding sluggish soul who could mingle in such scenes without becoming enthusiastic. If accustomed to make pen-pictures, he must be moved to make them in these noted resorts if ever. To be silent before this panorama of marvels, and allow the pen to mope or plod where nature eclipses art, and a thousand voices swell the praises of Him who gives tact and talent to both painter and sculptor, would be unnatural and irreverent. The appeal is to all the powers of the soul; and though all of them be enlisted to describe the scenes enumerated, exaggeration is impossible.

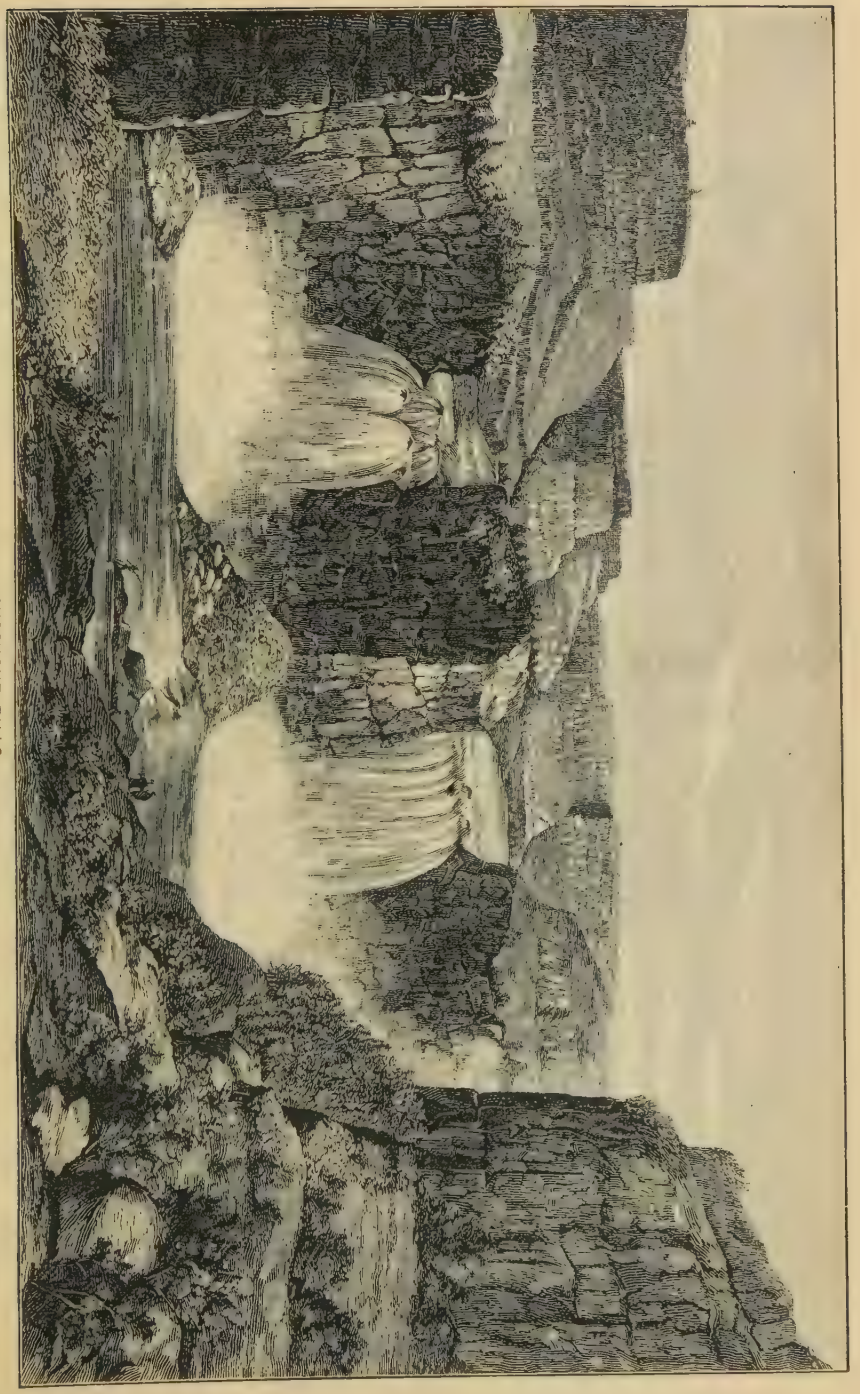


THE DUCHESS.

MISCELLANEOUS.

Shoshone Falls are on Snake River, in the Territory of Idaho. They are grand to the last degree. Exaggeration is impossible here. No writer can really do them justice. The granite walls, back of the roaring falls, rise like palaces, mosques, or magnificent fortifications. A writer who visited this famous waterfall furnishes a graphic description, from which we extract the following:—

"It was only a few rods of easy walking, when, piercing a border of fir, a rest was taken on Point Lookout. Just then the sun broke



SHOSHONE FALLS.

forth in renewed radiance, and from cliff to cliff there sprang a bow as perfect as ever was glorious in the heavens, — an arc of beauteous coloring against a background of glittering, bead-like foam, tumbling in crystal chaos two hundred and twenty feet. The circling halo lost its bases in the tumult and the mist, but its crescent was unbroken above.

"Niagara is different, but is not superior. Where that is calm, Shoshone is tempestuous. Where that pours over evenly, Shoshone bursts into a million wild jets, each with a diamond's lustre. Where that is environed by commonplace landscape, Shoshone dashes from between rocks, stately and time-stained, and nearly a thousand feet high. From Point Lookout the view is unobstructed, not only of

SAN PEDRO'S WIFE; OR, THE WOMAN OF THE PERIOD

the falls, but farther back, where the boat has often crossed. Seven distinct channels are to be seen, forming a number of preliminary falls, before, finally there is a grand reunion of the waters: and so united, over they go to be lost in the rage of a terrible surge, to riot in an infuriate whirlpool, and to rise soft as the feather of a bird, and be touched by the sun to splendor, and fall like a blessing of nature on the brow of the awed beholder. . . .

"Think of seven hundred and fifty feet front of a maddened — it almost seems malignant — torrent, devilish in the delight it takes in sweeping with a rush nothing but the eternal rocks could withstand; torn and tossed into billions of sparkling threads, with a constant play of prismatic hues, changing quicker than thought, half envel-

oped in its own mist, and then the wind carrying that away, leaving it unobscured in sublimity, unmatched and indescribable. Long the eye drinks here of the vials of wonder; and after the sight has become a memory, still the voice of the Great Unknown will seem to break in again upon the soul, just as it does when the uproar is deafening, and, by its very presence, turns one towards better and stronger things."

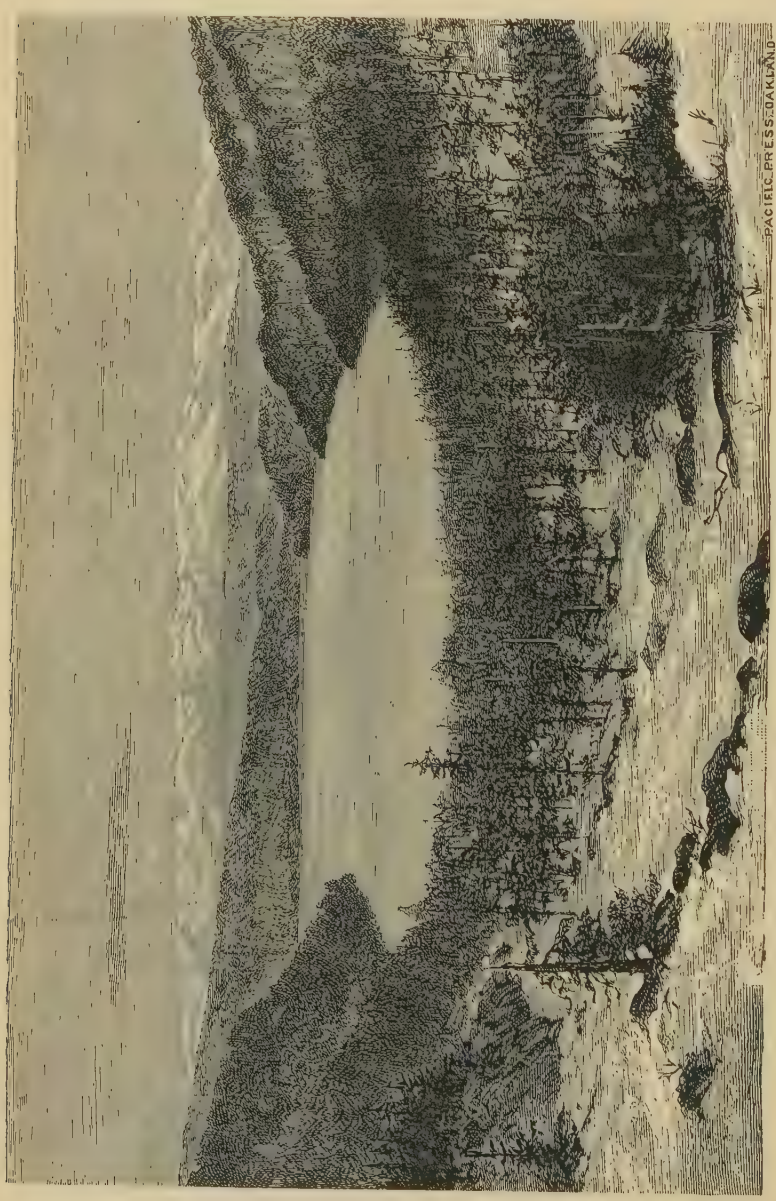
"San Pedro's Wife; or, The Woman of the Period," is a natural statue, and is situated near San Pedro Point, about three hundred miles from San Francisco. It is a remarkable object, and the name with which it has been christened is quite appropriate. Were a light to be set on the head of this stone woman, it would become the most unique and fantastic lighthouse ever known. It seems like a hint, in itself, to our enterprising race, to complete the work of nature by adding an uplifted arm, holding a flaming torch in the hand, that its flashing light may prove a benediction to unwary steps or belated vessels. From head to feet this singular rock-formation reflects much credit upon the elements which have done so excellent carving.

"Donner Lake," as shown on the following page, is situated on the summit of Sierra Nevada Mountains, eight or ten thousand feet above the level of the sea. It is a wonderfully clear and beautiful sheet of water, very deep and still, and is called, "The Gem of the Sierras." Located on a mountain-summit is sufficient of itself to invest the lake with novelty and romance. Such a phenomenon is confined to the Rocky Mountains, and is therefore rare.

The name of the lake, however, is derived from an appalling calamity which occurred upon its borders in 1846. A family by the name of Donner was crossing the Sierras when the first snow-storm of winter burst upon them. The family consisted of Mr. and Mrs. Donner and four children, with several servants, who assisted to drive a small herd of cattle. They had reached the lake, and had camped for the night, when a wild storm, such as that mountain region alone knows, struck them in its fury. On the following morning two feet of snow covered the trail, and the unabated storm continued to add rapidly to its depth. Mr. Donner was too unwell to go forward, but he put the children upon the horses, and started them off under the care of servants, hoping they might cross the mountains in safety. Mr. Donner's wife and a German servant remained with him. Most of the cattle stampeded during the night, terrified by the howling storm.

To make a long and appalling story short, it must suffice to say

that the storm continued fifteen or twenty days, until thirty feet of snow covered the vast wilderness. The children, however, under the



DONNER LAKE.

guide and protection of the brave servants, succeeded in crossing the mountains after hardships and much suffering, and reached comforta-

ble quarters. But a searching party did not dare to penetrate to the lake until spring returned; and when they reached the rudely constructed cabin, a terrible sight met them. Mr. Donner and his wife were dead, and the German, now a raving maniac, sat before the fire devouring a wasted human arm. He was seized, and, after a fearful struggle, was secured; and he finally recovered to tell the story of that winter's sufferings, almost without a parallel in history.

MULTNOMAH FALLS.

The Multnomah Falls is one of the marvels that delight the traveller after leaving Bonneville. Its water plunges down eight hundred feet, the same distance as the Oneonta Falls in the same vicinity. The Multnomah water strikes a ledge about two-thirds of the distance down, then, gathering itself up, it makes another plunge into the abyss below.

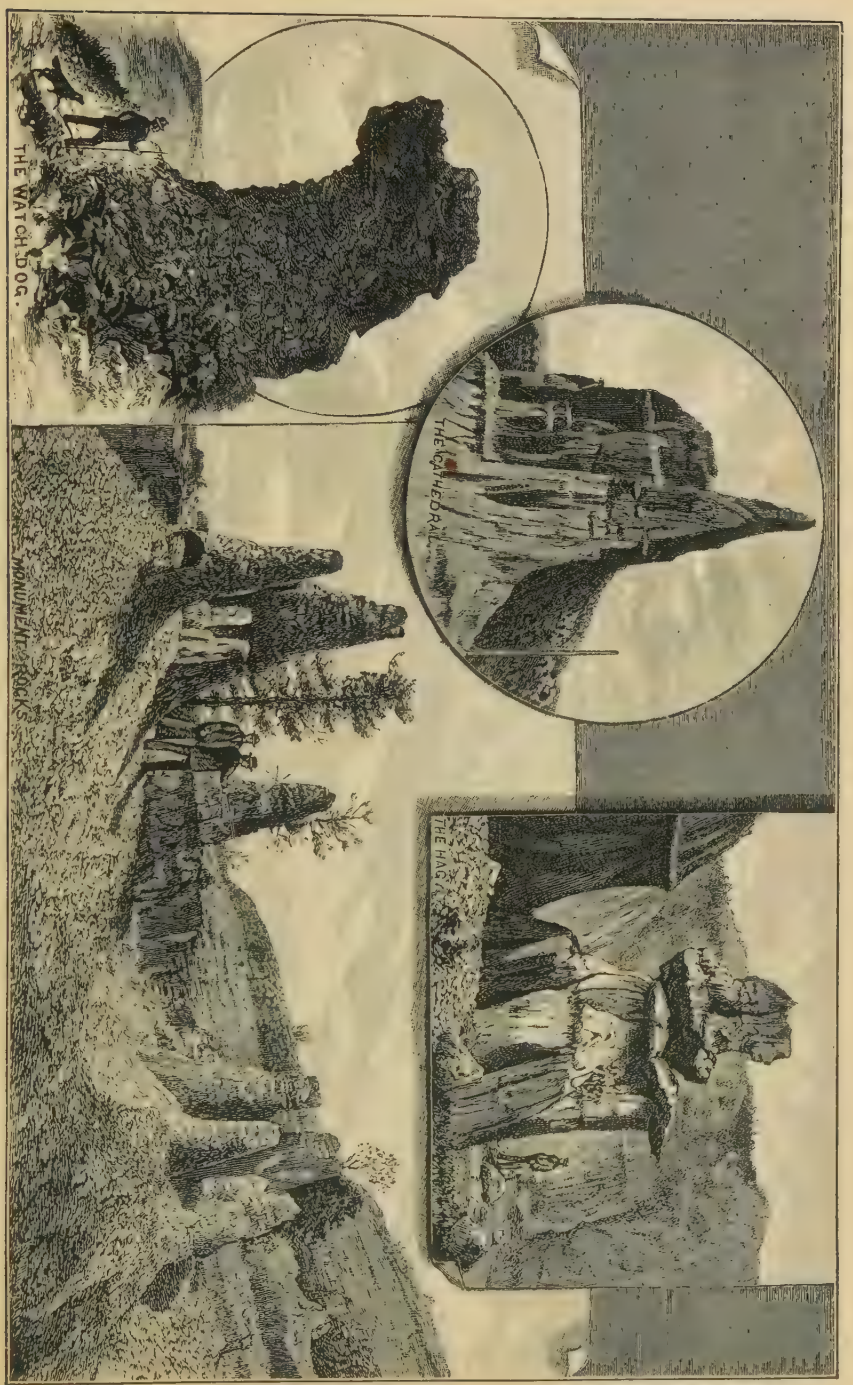
Scarcely any scene could be more novel and beautiful than this. In the distance the falling sheet of water appears like a wide silver ribbon sparkling in the sun.

The Pillars of Hercules are found on the Columbia River, a few miles from Multnomah Falls — another of the many marvels on the northern route to the Pacific slope. They are colossal, and the

PILLARS OF HERCULES.

Northern Pacific Railroad passes directly between them. These pillars awaken the wonder of men. A writer says: —

"How God's hand built them, — not in a manner of slow-mounting masonry, gaining adventurously and toilsomely, foot by foot, and pushing its scaffolding ever higher to keep command of the work, and straining its energy to raising aloft the chiselled and ponderous



PYRAMID PARK.

blocks to their place, — but with one lift, without break or course, or any gradations of rising completeness, the Supreme Builder set the domed mountains in their place — foundation, wall, and top stone — one sublime integral whole, unprofaned by craftsman's tools, untrod by foot of man."

Pyramid Park is on the line of the Northern Pacific Railway, and its name is derived from the interesting rock formations therein. Professor Denton says : " Such a valley containing myriads of mounds, buttes, pyramids, pinnacles, forts, and turrets. Here are cañons, ravines, gulches, and perpendicular precipices ; pyramids with brown and blue bases, and vermilion tops ; towers with unscalable walls that defy the earth-ransacking geologist — mounds of all sizes from ant hills to respectable mountains ; mounds single, twin, triple, and multiple ; mounds with yellow bases, white girdles, and blood-red caps ; mounds green, drab, white, blue, red, and mottled ; truncated mounds with mounds on them ; mounds beyond mounds like ocean waves lost in distance ; but interspersed with all these are beautiful slopes many acres in extent, green as emerald, and lovely spots covered with fragrant ground juniper, fit carpet for a queen." Another says : —

"It is in Pyramid Park that the most fantastic shapes appear. Every form of man or beast the broad empire of Rome could furnish, is here carved by the elements and placed in one long gallery of art. Monuments, cathedrals, pyramids, cones, and houses appear like excavations of a buried city. . . . As the train rolls swiftly through the park, we give our imagination full play, and find shapes the most grotesque and ludicrous, combined with others of imposing form, presenting a combination of which we never tire."

On the left of the illustration is a mammoth rock rising two or three hundred feet, presenting the appearance of a large cathedral. The resemblance is so striking that it is called "The Cathedral." On a line with the Cathedral to the right are "Monument Rocks" of various heights. Below is a rock formation which a tourist has very properly named "The Hag." It is worthy of the name, as the reader will find by a little study. At the left is "Watch Dog Butte," a lofty eminence on which nature has perched what appears to be a real terrier.

The illustration on the following page is that of a remarkable butte overlooking Green River City. It is built up of solid masonry, such as nature provides, and is surrounded by a massive monumental pile, resembling a public edifice of some sort. In its proportions, as well as its plan, it is unique and imposing. It stands sentinel over the

On Line of U. P. Railroad.

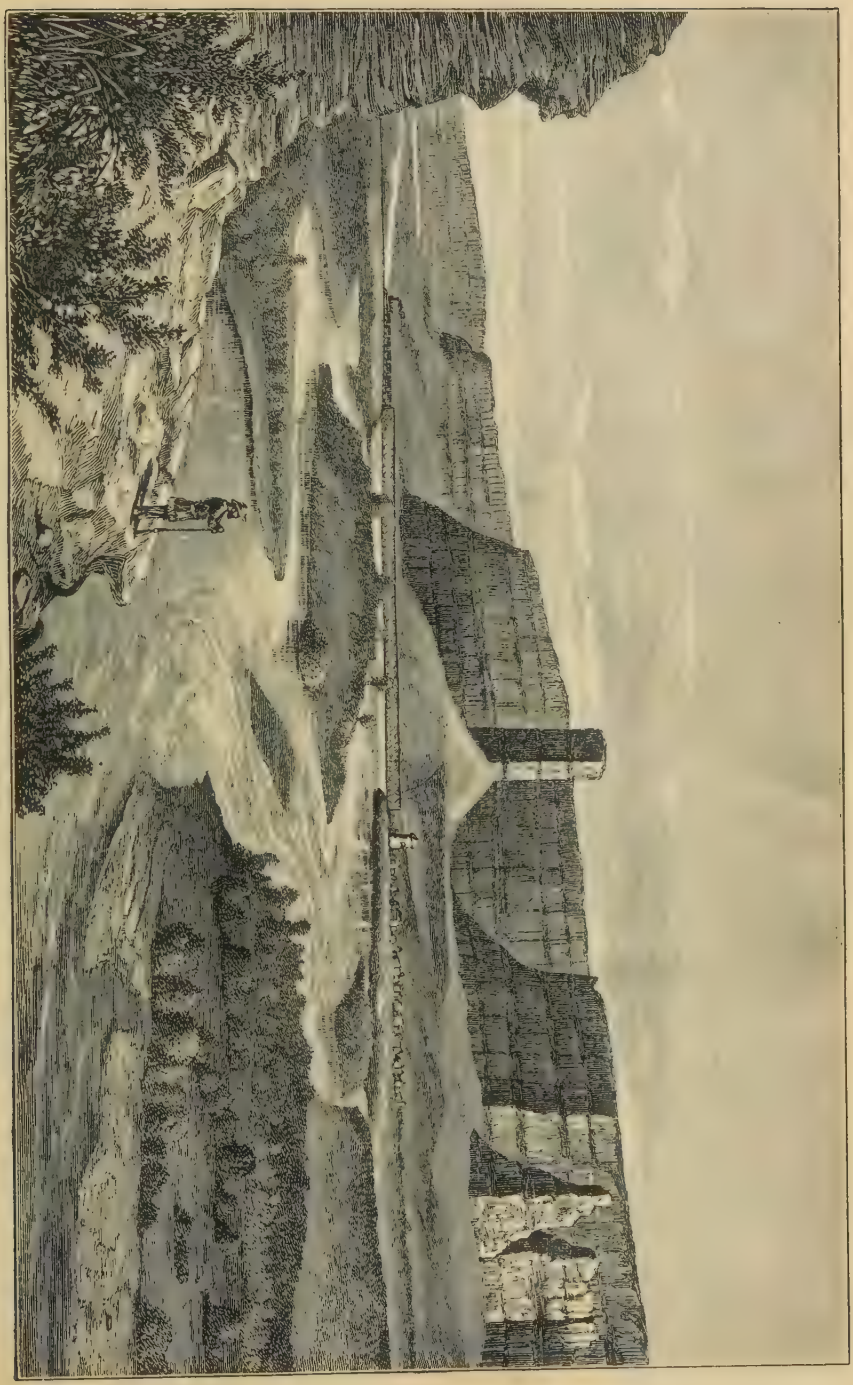
GREEN RIVER CITY AND BUTTES.

little city which nestles under its shadow, between its base and the river. Altogether, this butte and its surroundings presents a scene which, in some particulars, can scarcely be matched in the whole

land. The artist could not pass it without stopping to make a faithful sketch.

WAGON WHEEL GAP.
On Line of D. & R. G. Railway.

"Wagon Wheel Gap" is located in Southwestern Colorado, on the Rio Grande Del Norte, twenty-nine miles west of Del Norte, and



CASTELLATED ROCKS.

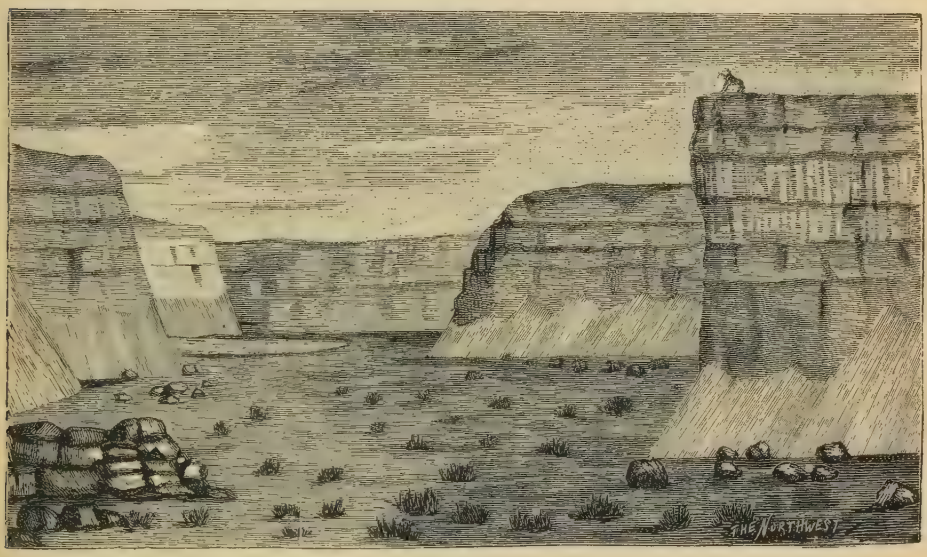
sixty-nine from Alimosa. It is in a chasm of the mountain range, which extends a hundred miles north and south, a gateway cut by rushing waters sometime in the past centuries, with vertical cliffs shooting upwards from five hundred to fifteen hundred feet. The place is called "Wagon Wheel Gap" in consequence of decaying wheels and other trumpery found there by pioneers a few years since. At first, it was supposed the relics discovered were all that remained of an exploring party massacred by Indians. It was subsequently found, however, that Fremont wintered there once in his explorations, and was obliged to abandon his wagons and most of his outfit to save his party from starvation and death.

RHODA'S ARCH.
Sawatch Range, South River, near Antelope Park.

The illustration on the preceding page represents the scene that opens to the tourist as the railway train, which follows along the river, moves into the gap and up to the station. On the right hand, the palisades or mountains of rock rise from twelve hundred to fifteen hundred feet above the track, continuing their wavy line of unsurpassed grandeur for several miles. These stupendous walls are of reddish gray sandstone, with only room enough at their base for the river and railway. On the left hand of the track, the mountains rise over twenty-three hundred feet in solemn majesty above the track. The whole scene is one of unparalleled majesty. The beholder alone can fully appreciate it.

Castellated Rocks rise several hundred feet along the banks of the river, and extend for miles. They present one of the grandest spectacles which the tourist enjoys in the New West. They are called "The Green River Shales," and their prevailing color is a grayish buff. Other colors, as red, green, and white, mingle here and there, contributing beauty to the imposing scene. Like huge walls of granite, laid block upon block in symmetrical proportions until they tower higher than the tallest church spire in the land, these castellated rocks challenge the surprise and wonder of men.

Rhoda's Arch is symmetrical and finished as if planned and wrought by human skill. Its surroundings are peculiarly impressive.



GRAND COULEE, W. T.

Stone monuments stand around, some tall and capped, others rising in sharp pinnacles — all seeming to belong to the same class of wonders as the arch itself. It is a rare spectacle, one of the novel scenes that will live in memory.

There is no greater marvel in Washington Territory than the "Grand Coulee," represented above. It has been called a "deep crack in the surface of the earth"; but we shall call it a cañon ninety miles long, with basaltic walls rising perpendicularly four hundred feet, the grandest rock formation of the Northwest. It is a spectacle which never loses its hold upon the memory.

About half-way through the valley the walls are broken down, so

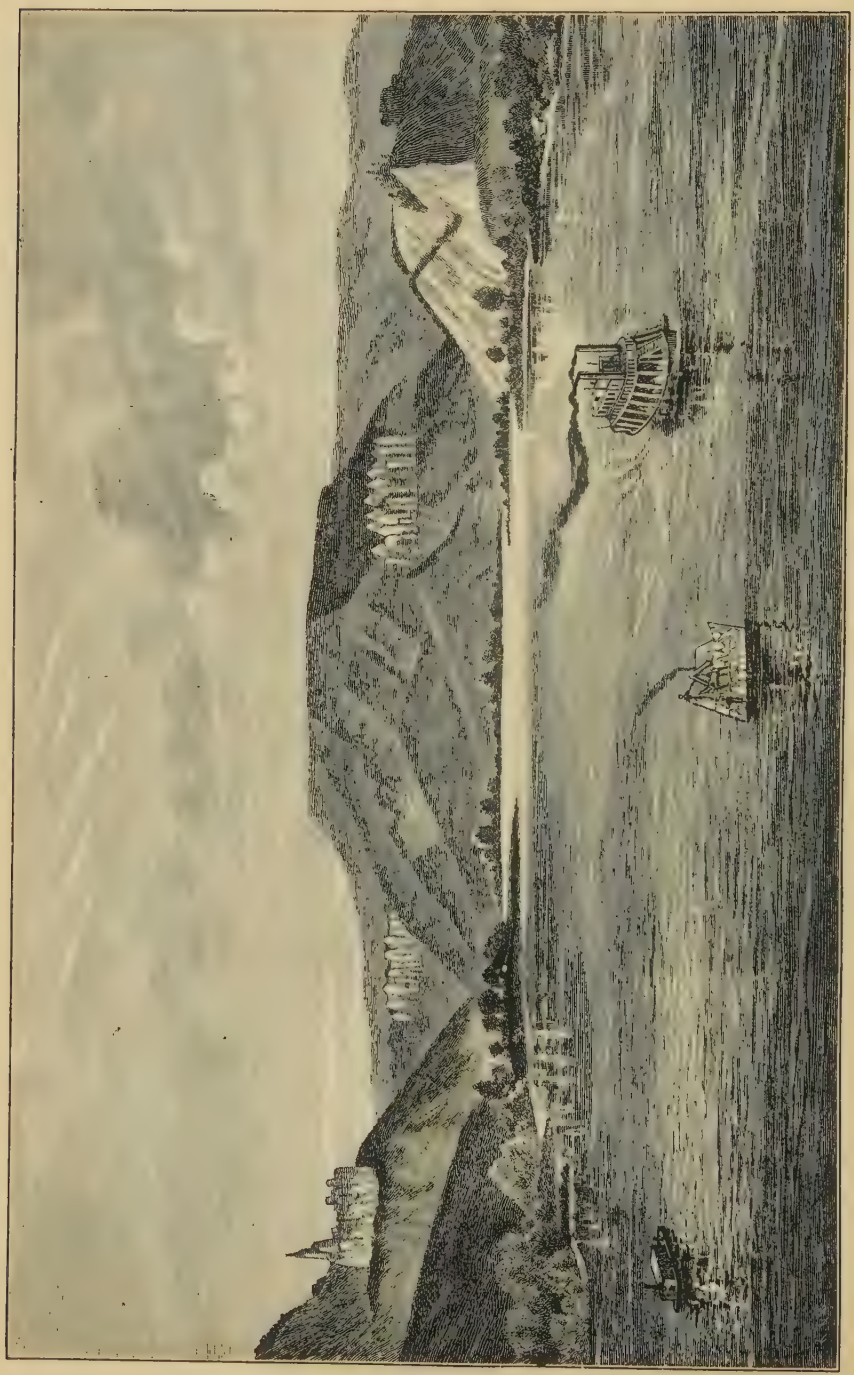
THE VALLEY OF THE LAUGHING WATERS.

that wagons can pass over it comfortably. "From this crossing the Coulee slopes both ways, north to its mouth in the gorge of the Columbia, and southeast to broaden out and encircle a chain of lakes, and finally to disappear in the great sandy plain near the junction of the Snake and Columbia rivers." This cañon is strewn with volcanic *débris*, imparting to it a very weird and desolate appearance.

"The Valley of the Laughing Waters," in Utah, contains scenes of picturesque beauty and awe-inspiring grandeur unsurpassed in the world. The full-page illustration represents a rocky region where some of the most remarkable feats of nature are found. Rocks of fantastic forms, often massive and phenomenal, meet the eye on every hand. Perhaps there are no objects in Yosemite grander than many to be seen in this locality. It has not the beautiful and grand waterfalls of the Yosemite, but in other particulars it is a worthy rival of that world-renowned "Wonderland." Towers and pinnacles of rock rise into the air like the spires and turrets of an Eastern city, and majestic cliffs challenge the admiration and wonder of travellers at every step.

INDIAN ROCK.

The "Church, Castle and Tower" is on the Missouri River, Montana, and derives its name from the remarkable rock-formations on the sides of the mountains. On the left stands the stone church, situated on a lofty eminence, with spire and turrets of more symmetrical proportions than those of many church edifices reared by art. On the right, as well as in the centre, are massive structures, having the



CHURCH, CASTLE, AND FORTRESS.

appearance of natural fortresses, built, or rather grown, in mountain fastnesses, impregnable and wonderful.

"Indian Rock" is situated on an island in Columbia River, four miles from Celilo. Its name is derived from the profile of an Indian face, so conspicuous on its wall. From time immemorial the Indians have worshipped the profile, and have called it "The Great Spirit of the Columbia." It can be seen from the deck of a steamer passing through the old channel on the southwest, and also by the use of a

OLD WOMAN OF THE MOUNTAIN.

glass from the line of the O. R. & N. Co., two miles below. It is difficult to approach the island on account of the rapid current, which fact adds to the superstitious notions of the Indians, who were wont to risk their lives once a year to worship the Indian face on the rock. None of them ever ventured to live upon the island. The rock is a basaltic ridge, extending five hundred feet in length, and rising high into the air.

The above scene is located in Montana, near Helena. The Northern Pacific Railway runs near by, although the "Old Woman" in granite cannot be seen from the train. It is one of the grandest localities on the line of the Northern Pacific, near where the tortuous

railway descends into the valley below. The whole region is crowded with objects of interest, none more so than the singular rock-formations of which the "Old Woman" is one. The reader will agree with us that this rock was correctly named, its form showing a very striking resemblance to an aged female.

We interject the statement here, that, in addition to the class of marvels considered, the rock-formations of the New West are truly remarkable. For instance, west of Pueblo, in Colorado, along the Arkansas River, there are miles and miles of wall from four and five to fifteen feet high, just as nature laid it, much of it as symmetrical and finished as skilled labor can produce. It is seen in the distance often, enclosing the summits of hills like the walls of a penitentiary or navy yard. Again, it extends for miles along the river, as if it were the boundary-wall of a grand park, or the guarded grounds of an agricultural society. Here and there the rocks assume the appearance of fortifications, cathedrals, battlements, and towers. The whole appearance is that of solid masonry, such as we expect of human industry and skill. Let the pen of another confirm our description.

Mrs. Dr. Blake, speaking from personal observation, says: "Beyond Pueblo, the Arkansas widens into a rather sluggish, muddy stream, pretty in nothing except its windings, and the delicate freshness of cottonwoods here and there on its banks, which are always newly lovely to us. It has, besides, for many miles, a fringe of fortifications in wonderful perfection; some in perfect cap-a-pie fighting order, some ruined and broken, but altogether one of the most picturesque and complete pieces of nature's workmanship we have met yet. It seems utterly impossible to believe that the walls and battlements, which appear of such solid masonry, should not have been laid with hands, or that the eye of some human architect did not direct the soaring grace of those lofty towers, or the solemn strength of these long lines of ramparts."

The picture on page 129 illustrates the variety of form which the stones of these walls present.

In one of the thriving cities of Kansas we saw a stone dwelling, built of granite blocks from twelve to eighteen inches long and half as thick and wide, more or less, just as they were dug from the earth. Until otherwise informed we supposed that the stones were hewn and hammered for the habitation. Yet these blocks of stone were dug from the surface of the earth, two or three miles away, where, subsequently, we saw them by the acre. Those of kindred size and

form were selected for the building; hence they appeared to have been cut by one pattern. Near by was a handsome face-wall, a portion of it eight or ten feet high, built in the same way, not one block in the wall hewn or hammered.

In the same city, also, the flag-stones are quarried seven miles away, and laid on the sidewalks with no labor expended upon them except to cut them the required width. We saw one slab sixteen feet long by five feet and a half wide, smooth enough for the side-

FORMS OF WALLS.

walk without one stroke of a hammer. We have not seen nicer sidewalks in any city, and yet the stones were laid just as nature furnished them, after cutting them the necessary width. We suggested to one of the authorities that the next desirable acquisition for the town was a quarry that would turn out hitching-posts all ready for setting. The citizens were then engaged in a search for natural gas, with which to light and heat the city. Their expectations once realized, and the New West will boast of a city run by nature — a marvel indeed!

The following cut represents Chicago Lakes, the principal and high-

est one being eleven thousand five hundred feet above the level of the sea — the highest body of water on the American continent. The mountains rise three thousand feet above the lake. It was here that the celebrated painter Bierstadt found the subject for his great painting, "A Storm in the Rockies." The highest of this group of lakes is about one thousand five hundred feet higher than Green Lake, in the

FISHING ON THE MOUNTAINS.

same vicinity, two miles from Georgetown. The latter has become a famous resort for pleasure-seekers, where trout-fishing is exceptionally good, in waters so deep that, in places, they have never been sounded.

There is peculiar novelty in going a-fishing up towards the sky instead of in the other direction. To catch trout in a lake situated twice as high as the summit of Mount Washington, is a pastime not afforded to sportsmen in many lands. It is one of the "patent rights" of the New West.

Chicago Lakes are reached by good trails from Fall River, about three miles above Idaho Springs. The route is romantic with wild and impressive scenery, rewarding the tourist at every step with grand and unusual sights.

Another of the curiosities of the New West is the petrified forest. Mr. Cozzens describes one which he saw in Arizona, on the banks of the Little Bonita, just after the Apache Indians had made a raid upon his party, and robbed Dr. Parker of his horse.

PETRIFIED FOREST.

"Here we came upon the remains of a petrified forest, prostrate, and partially buried in a kind of red mud. Hundreds of trees lay here, and had been converted by some chemical process into specimens of variegated jasper. One tree that we saw measured ten feet in diameter, and was over a hundred feet in length. Some looked as if they had been charred by fire; their trunks were of a dark brown color, while the smaller branches and twigs were of a reddish hue. To me there was something impressively wonderful in the stupendous result of old Nature's labors in her secret laboratory. Who should

derive the cause? Who tell the history of the prostrate forest? How long has it there existed, and how many more centuries will it be there undisturbed?

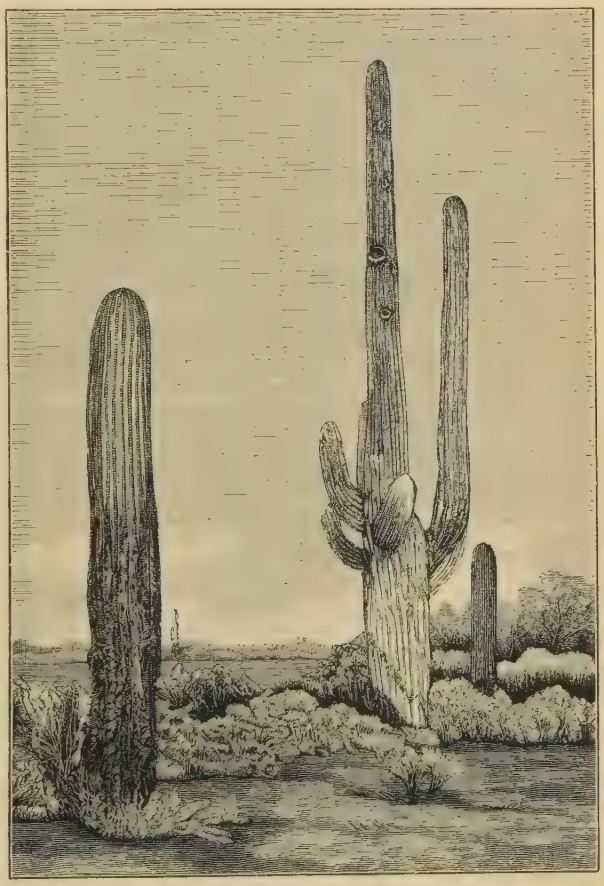
"We brought away some beautiful specimens, although, owing to the depredations of our Apache friends, we were somewhat short of means of transportation. We found the waters of the creek de-

SUMMIT OF ITALIAN MOUNTAIN.

lightfully cool and pleasant to the taste; and, notwithstanding the suggestion of one of the party, that it might have the same effect upon us that it had evidently had upon the giants of the forest lying around us, we all drank of it freely, and enjoyed its refreshing coolness. Dr. Parker feelingly alluded to the loss of his horse, and the miseries of a pedestrian life through such a rough country, and urged us, in

case we should observe any appearance of petrifaction about him, not to leave him by the roadside, for the purpose of petrifying the traveller who came after us, but to give him Christian burial; and that for a headstone we should use a piece of the rock on which he split, with this inscription thereon: 'Horseless and homeless a wanderer passed.'"

The Italian Mountain is in Gunnison County, Colorado, and its summit, as seen in the cut, is 13,255 feet above the level of the sea. Tourists can reach the summit with comparative ease. Pike's Peak is less than a thousand feet higher than this mountain, and scarcely affords a better view to the traveller who perseveres in his effort to plant his feet upon its crown. It is of singular formation, as the illustration shows, and presents to the student of geology a fruitful subject for investigation.



ARIZONA CACTI.

The cactus of the Gila Desert, Arizona, is a natural phenomenon. To those who are accustomed to see a cactus in a flower-pot a few inches high, these *Cacti Giganti* of the New West must appear marvellous indeed. Some of them are sixty feet high. The illustration shows the different forms of growth; though many are a perfect cone, from twenty to sixty feet high, with a diameter of three feet

near the ground. Their color is of different shades of green and yellow; and they are covered with sharp thorns, some of them three inches in length. Each cone-cactus bears a single flower on its top annually, and yields a kind of fruit which the natives highly prize.

Many of the huge cones have several smaller ones growing out of their trunks, at different heights, and they shoot upwards, parallel to the trunks that bear them. There is no tree or shrub around them over three feet high, so that they stand out in bold relief over the barren waste.

Woodpeckers are plenty as rattlesnakes and lizards in this desert country, and the former elude the destructive instincts of the latter by pecking holes in the cactus near its top, where they build their nests and rear their young in safety.

Captain Dutton, of the United States Survey, says: —

"Many species of cactus are seen, the most abundant of which are the opuntias, or prickly-pears. Of these there are four or five very common species. A large cactus orchard in blossom is a very beautiful sight, displaying flowers which, for beauty of form and richness of color, are seldom surpassed by the choicer gems of the conservatory. Nor is it less attractive when in the fruit; for it yields a multitude of purple 'pears,' which are very juicy and refreshing, and by no means contemptible in flavor."

II. MARVELS OF RACE.

"HOW strange that the newest part of our country should turn out to be the oldest," remarked a citizen of Las Vegas, New Mexico.

"How so?" we responded, not quite apprehending his meaning.

"Well, our country west of the Missouri River is called the 'New West,' he replied; "but it is much older than New England. Long before the Pilgrims landed on Plymouth Rock, this part of our land was inhabited by an intelligent, enterprising people."

"Very true," we answered; "but they passed away, and left the Indian and buffalo in full possession. Their *ruins* are the only evidence you have of their having lived here."

"And that is evidence enough," he quickly responded. "In some respects it is the most interesting kind of evidence. A certain mystery invests their history, adding to, instead of subtracting from, its fascination."

The speaker was right. The history of the ancient races which dwelt centuries ago in Colorado, New Mexico, Arizona, and other portions of the New West, has come to the front. Archæologists, ethnologists, historians, and other scholars, in the United States and Europe, have become deeply interested in these ancient peoples. Who were they? Whence did they come? Whither did they go? Were they Toltecs? Were they Aztecs? Were they related to the Pueblo Indians, still occupying a portion of our Western domain? Were they connected with the Mound-Builders of the Mississippi Valley, or with those of Ohio or Indiana? Do the remains of human races scattered over the Old and New West indicate a unity of origin of the aboriginal inhabitants of North America? These questions indicate the depth of mystery to be sounded before a satisfactory solution of the problem is reached. That the problem will be solved there can be no reasonable doubt. In addition to the large number of scholars investigating the subject on their own account, the United States Government is pushing exploration as rapidly as possible. The time is not far distant when the history of these races

will be a matter of authentic record. Until then we must content ourselves with the meagre amount of knowledge in our possession; which, however, is quite sufficient to awaken the lively interest of the general reader.

Without question, Columbus supposed he had discovered a "new world" when he set his foot upon this western shore; and it was a "new world" to him; but it was old to the races which had lived upon it for centuries before he came. It is new to us, also, because we never knew, until recently, that such races ever dwelt within its borders. The disclosure of the fact was a great surprise. At first it was received with many grains of allowance. The most credulous were not inclined to accept the announcement without undoubted proof. But the study and researches of the past decade have dissipated all lingering doubts. More light has been thrown upon the subject within fifteen years than during the previous five centuries. The year 1900 will possess so much light and knowledge relating thereto, according to present indications, that the history of the ancient races of the New West will be well understood.

Not many years after Columbus discovered the "New World," strange rumors reached the authorities of Spain in regard to populous towns and cities on its western borders. The "Seven Cities of Cibola," magnificent and rich, were said to be founded there, inhabited by an intelligent and enterprising people. It was a land of gold, also. The earth was full of precious metals, which the people mined at their leisure. These exciting rumors appealed to the Spaniards' love of gold; and there is no doubt that they had more or less influence in organizing the exploring expedition of 1527, by order of the king, commanded by Pamphilo de Narvaez, to invade the country which rumor made so populous and rich. This exploring party perished by shipwreck, except Alvar Nuñez Cabeza de Vaca and three companions. Ten years Vaca and his companions traversed portions of the New West, exploring the entire territories of New Mexico, Arizona, and Utah, and perhaps pushing into Colorado before entering Mexico. They found large cities "made of earth," inhabited by a peaceful and interesting race, worshippers of the sun, who brought their blind and sick to the white men to be healed. They found evidence of immense wealth, inexhaustible mines of gold and silver, enough to satisfy even the greed of Spanish rulers. The report of Vaca to his king confirmed the rumors which had already excited the Spaniards, and they became mad with the lust of gold and passion for adventure; and valiant cavaliers, who had won renown in the bat-

tles of the Moor among the mountains of Andalusia, and had seen the silver cross of Ferdinand raised above the red towers of the Alhambra, now turned their brave swords against the feeble natives of the New World. Less than half a century had gone by since the discovery of America; the conquests of Pizarro and Cortez were fresh in men's minds, and an expedition, containing the enchanting quality called hazard, was soon organized. Illustrious noblemen sold their vineyards and mortgaged their estates to fit the adventurers out, assured they would never need more gold than they would bring back from the true El Dorado. The young men saw visions; the old men dreamed dreams; volunteers flocked to the familiar standards; and an army was soon ready "to discover and subdue to the crown of Spain the 'Seven Cities of Cibola.'"

And so these people of the New World were conquered, and their country occupied in the name of the king of Spain.

Here is the first account we have of an ancient race dwelling under the shadow of the Rocky Mountains; and even this scarcely received public attention until recent discoveries revived the old record. Through the military operations of the United States Government, and more especially its geological surveys, the remains of the ancient "Cave" and "Cliff Dwellers" have been discovered within a few years, followed by the most remarkable and interesting disclosures. We shall be able to furnish such views of the cave and cliff dwellings of centuries ago as to leave no doubt in the mind of the reader, that, even before Columbus sailed on his voyage of discovery, a peaceful, industrious race, cultivating the soil and practising some of the arts, dwelt in considerable portions of the New West.

CAVE-DWELLERS.

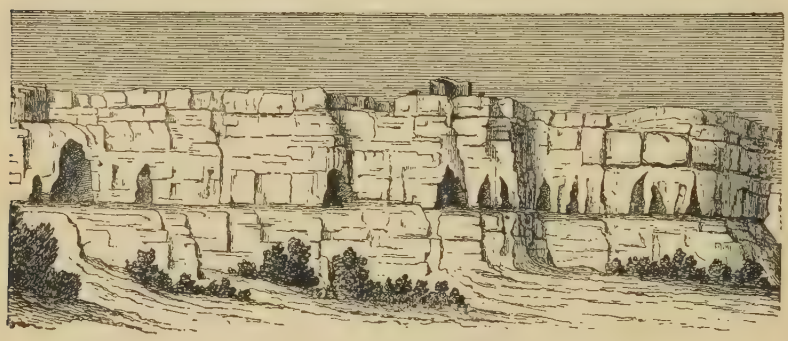
On the bluffs of Beaver Creek, a small stream tributary to the Rio Verde, are about fifty walled caves of different sizes, once the refuge of a prehistoric race, of whom the present Indian tribes have no knowledge or traditions, although their traditions run back four or five centuries. These caves are from five to twenty feet in depth. The mouths are closed by mason-work of stone and cement still in a good state of preservation. The larger caves are divided by wood and stone partitions and floors into numerous small apartments, where it would seem this strange people passed years of doubt and fear, threatened by famine within, and by cruel persecution and torture from a besieging enemy without. The lower caves were reached

by climbing the projecting points of the bluffs; but the higher ones could be reached only by ladders, and that, too, at the imminent risk of tumbling down from sixty to one hundred feet.

Near by these caves are the ruins of stone dwellings built without cement, evidently the homes of the people who constructed the caves for a refuge from their enemies.

W. H. Holmes, of the United States Survey Corps, examined these ruins carefully, and he says the cut "gives a fair representation of the present appearance of these cave-dwellings." He remarks further: —

"Small fragments of mortar still adhered to the firmer parts of the wall, from which it is inferred that they were at one time plastered. It is also extremely probable that they were walled up in front and furnished with doors and windows, yet no fragment of wall



CAVE-TOWN NEAR THE SAN JUAN.

has been preserved. . . . This circumstance should be considered in reference to its bearing upon the question of antiquity. If we suppose the recess to be destroyed is six feet deep, the entire cliff must recede that number of feet in order to accomplish it. If the rock were all of the friable quality of the middle part, this would indeed be the matter of a very few decades; but it should be remembered that the upper third of the cliff-face is composed of beds of comparatively hard rocks, sandstones, and indurated shales. It should also be noted still further that at the base of the cliff there is an almost total absence of *débris*, or fallen rock, or even of an ordinary talus of earth, so that the period that had elapsed since these houses were deserted, must equal the time taken to undermine and break down the six feet of solid rock, plus the time required to reduce the solid rock to dust;

considering, also, that the erosive agents here are unusually weak, the resulting period would certainly not be inconsiderable."

This illustration furnishes a view of cave-dwellings somewhat different from those just described. They were discovered by A. D. Wilson, chief of the United States Topographical Corps in Southern Colorado. The chief building was about the size of the Patent Office at Washington. As described by him to another,[1] "it stood upon the

ANCIENT CAVE-DWELLINGS ON THE McELMO.

banks of the Animas, in the San Juan country, and contained perhaps five hundred rooms. The roof and portions of the walls had fallen, but the part standing indicated a height of four stories. A number of the rooms were fairly preserved, had small loop-hole windows, but no outer doors. The building had doubtless been entered originally by means of ladders resting on niches, and drawn in after the occupants. The floors were of cedar, each log as large round as a man's head, the spaces filled neatly by smaller poles and twigs, covered by a carpet of cedar bark. The ends of the timber were

[1] Emma C. Hardacre.

bruised and frayed, as if severed by a dull instrument; in the vicinity were stone hatchets, and saws made of sandstone-slivers about two feet long, worn to a smooth edge. A few hundred yards from the mammoth building was a second large house in ruins, and between the two strongholds ruins of small dwellings, built of cobble-stones laid in adobe,[1] and arranged along streets, after the style of the village of to-day. The smaller houses were in a more advanced state of ruin, on account of the round stones being more readily disintegrated by the elements than the heavy masonry. The streets and houses of this deserted town are overgrown by juniper and piñon, — the latter a dwarf, wide-spreading pine which bears beneath the scales of its cones delicious and nutritious nuts. From the size of the dead as well as the living trees, and from their position on the heaps of crumbling stones, it is evident that a great period of time has elapsed since the buildings fell. How many hundred years they stood after desertion before yielding to the inroads of time cannot be certainly known."

Some writers maintain that the presence of cedar wood in these ruins, in a good state of preservation, is evidence that great antiquity cannot be attached to them. There is no reason why cedar in Southern Colorado, well protected, should not continue sound as long as it does in Asia or Egypt. In the former country it has been kept a thousand years, and in the latter two thousand, after being taken from the forest. The cedars of Colorado, and other parts of the Southwest, never rot. They die, and stand erect, without sap or rot. "The winds and whirling sands carve the dead trees into forms of fantastic beauty, drill holes through the trunks, and play at hide-and-seek in the perforated limbs, until, after ages of resistance, they literally blow away in atoms of fine, clear dust."

Many of the ancient towns in question were built in the form of a circle, as well as in that of a square and parallelogram. But whatever form was adopted, the measurement was exact. The square was a perfect square, and the circle a perfect circle. The cut on next page represents a circular town, with three tiers of dwellings, one above the other, the second tier receding from the first, and the third from the second. Evidently it was built both for homes and defence. It was town and fort combined.

The rooms of some of the houses referred to were plastered, and the mortar was put on with the hands, — a fact established by the distinct impression of the fingers, and, in some instances, of the

[1] Mud or clay bricks dried in the sun.

whole hand. In one instance, the plastering bore the imprint of the little chubby hands of children, who, no doubt, were delighted with the impressions they could make in the mortar before it was dry, proving that they were human.

The foregoing sketches of cave-dwellings are a fair illustration of all which abound in New Mexico, Colorado, Arizona, Utah, and other portions of the New West. We need not multiply illustrations, since the remarkable ruins of some mammoth structures to follow, with the

A CAVE-TOWN RESTORED.

still more wonderful cliff-dwellings, will acquaint the reader, as far as can be possible at present, with this mysterious race of human beings.

Amongst the ruins of the valley of Gila, Arizona, is the "Casa Grande," whose marvellous history antedates even the coming of the Spaniards.

The eminence on which it stands is two and one-half miles from the Rio Gila River, and both the structure and its surroundings furnish evidence that it must have existed five or six centuries, and

probably longer. There is little doubt that Coronado referred to this ruin under the name of the "Chichilticalle, or the Red House." Nearly two hundred years ago this ruin was visited by Fathers Mange and Rino, and it was very ancient at that time. Father Mange described it as including eleven buildings then, "surmounted by a protecting wall of moderate height." Now, only the following ruin is in such a state of preservation as to admit of intelligent examination, although two others are clearly visible. "It is built of large adobes measuring four feet by two, and it is fifty feet by forty feet in size. The walls are five feet thick at the base, and gradually decrease in breadth toward the top. The inside is divided into five

THE CASAS GRANDES IN 1859.

rooms, the central one being eight feet long and fourteen wide; the others are thirty-two feet long by ten wide.

"Fragments of cedar-wood beams, still inserted in the walls, prove that the buildings originally consisted of three, perhaps in its central portion of four, stories. No staircase, nor anything to take its place, can be made out, so that communication between the stories must have taken place by means of ladders. A vast conflagration has everywhere left indelible traces, and this is supposed to have been the work of the Apaches, the wildest and most indomitable of all the Indian tribes. The 'Casa Grande' was the centre of an important establishment. Bartlett tells us that in every direction, as far as the eye can reach, we see crumbling walls and masses of rubbish, the

remains of old buildings, while Father Mange, Rino, and Font say that the plain was covered for a radius of ten miles with hillocks of adobes turned to dust. In fact, volumes would not suffice to describe all the ruins in these regions, or all the people who have inherited them."[1]

The existence of artificial canals, also, in this vicinity, furnish undoubted proof that irrigation was understood and practised in that far-off period. One canal, evidently intended to receive the waters of the Gila, and distribute them over the cultivated lands, appears to have been nearly ten miles in length, twenty-five feet wide or more, and ten feet deep.

A TOWER.
On the summit of a rock in the McElmo Valley

It is claimed that in that portion of Arizona known as Tonto Basin, embracing more than ten thousand square miles, nearly every eminence furnishes unmistakable proof of an ancient race in its ruins. In some of the valleys, the foundations and walls of cities have been discovered, once inhabited by thousands of intelligent and busy people. Although their history is involved in mystery, there is no question now, that it runs back into the centuries before Columbus discovered this western world. And, while the writers and explorers of the past have believed that the races of to-day radiated over the earth from some point in Asia, the opinion of Señor Altamirano, of Mexico, the best Aztec scholar ever known, is, that Asia was peopled from this country, instead of this country being peopled from Asia. In other words, this is the *old* world instead of the *new*. What disposition he makes of the Garden of Eden does not appear.

The above ruin is perched on the top of a rock in the McElmo Valley, with good evidence of an agricultural people dwelling near by.

[1] Prehistoric America, by the Marquis de Nadaillac.

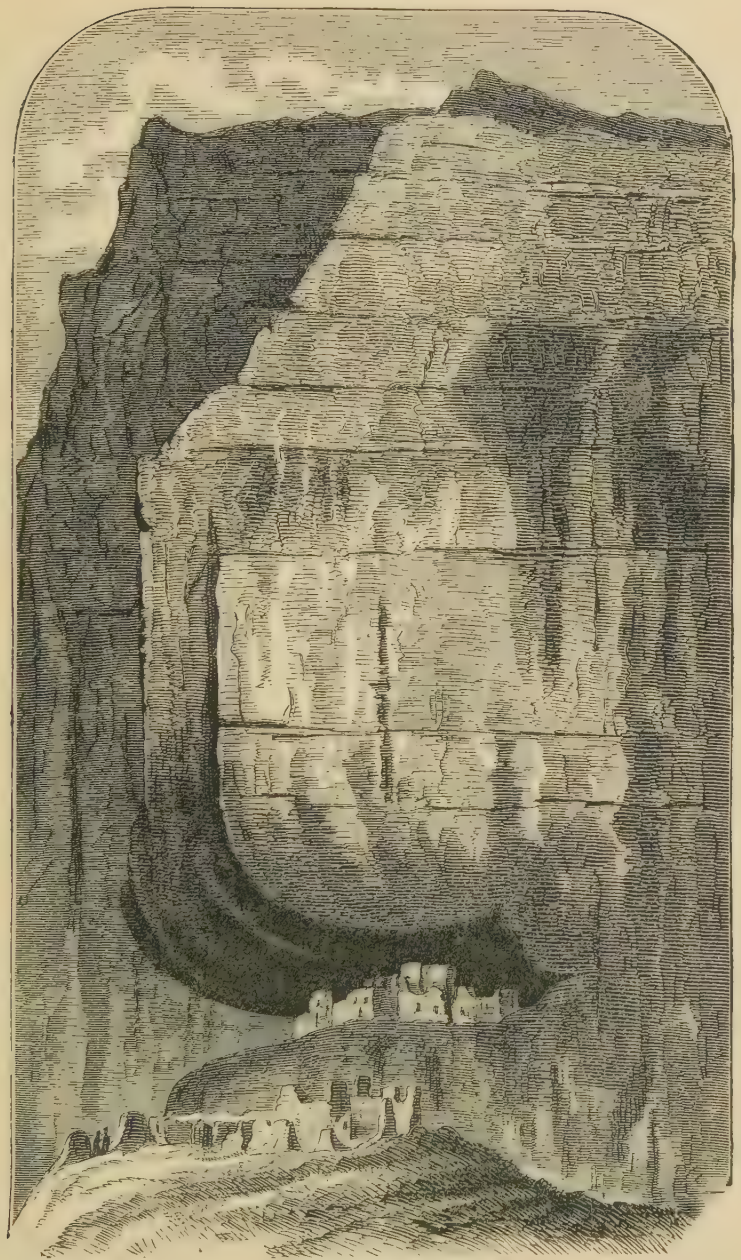
The structure was erected, no doubt, both for observation and defence. Holmes says that "every isolated rock and every bit of mesa within a circle of miles is strewn with remnants of human dwellings," as represented by the cut.

In New Mexico there are "Casas Grandes" even more remarkable than that of the Gila Valley. They are in San Miguel Valley, near the boundary line of the Territory. "Masses of rubbish in the midst of which rise parts of walls, some of them fifty feet high, indicate the old site of the town. The walls were built of adobes. These adobes were of very irregular length and twenty-two inches thick, while the walls themselves were nearly five feet wide and simply coated with clay moistened with water. The chief building was eight hundred feet long on the fronts facing north and south, but only two hundred and fifty on those to the east and west."

"A short distance off, other buildings surround a square court. Here, too, we find the little cells which are one of the characteristic features of the 'Casas Grandes,' as of the cliff-houses and the pueblos. This is an important indication of similar habits, and of the similar origin of the builders. There are more than two thousand mounds in the neighborhood of the 'Casas Grandes,' and it is probable that they were burial-grounds. A few miles farther off rises a regular fortress, not built of adobes, but of well-dressed stones put together without mortar of any kind. The walls are from ten to twenty feet thick, and the summit is reached by a path cut in the rock."

Lieutenant Simpson, of the United States corps, in his "Navajoe Expedition," describes the ruins in the Cañon de Chaco, and in the valley of the Rio de Chelley. There are over thirty of these ruins, six of which he describes, viz.: Pintado, Meje-gi, Una-Vida, Hungo Pavie, Chettro-Kettle, and Peñasca-Blanca. All but the last strikingly resemble each other, so that the illustration on the following page substantially represents them all. The Lieutenant says:—

"The pueblo Pintado formed one structure, and was built of tabular pieces of hard, fine-grained, compact, gray sandstone, a material which is unknown in the present architecture of New Mexico. Age and the atmosphere have imparted a reddish tint, the layers, or slabs, being not thicker than three inches, and sometimes as thin as a fourth of an inch. The masonry discovers a combination of science and art, which can only be referred to a higher state of civilization and refinement than is to be found in the works of either the Mexicans or Pueblos of to-day.



RUINS IN THE CAÑON DE CHACO.

"So beautiful, diminutive, and true are the details of the structure, as to give them at a little distance the appearance of a magnificent piece of mosaic work.

"In the outer face of the buildings no signs of mortar are to be seen, the intervals between the beds, or layers, being chinked with beautifully colored pebbles of the minutest thinness; the filling and backing of the walls is done in rubble masonry, the mortar, however, showing no indication of the presence of lime; their thickness at the base is a little more than three feet, while higher up it is less, diminishing every story by retreating jogs on the inside from the bottom to the top.

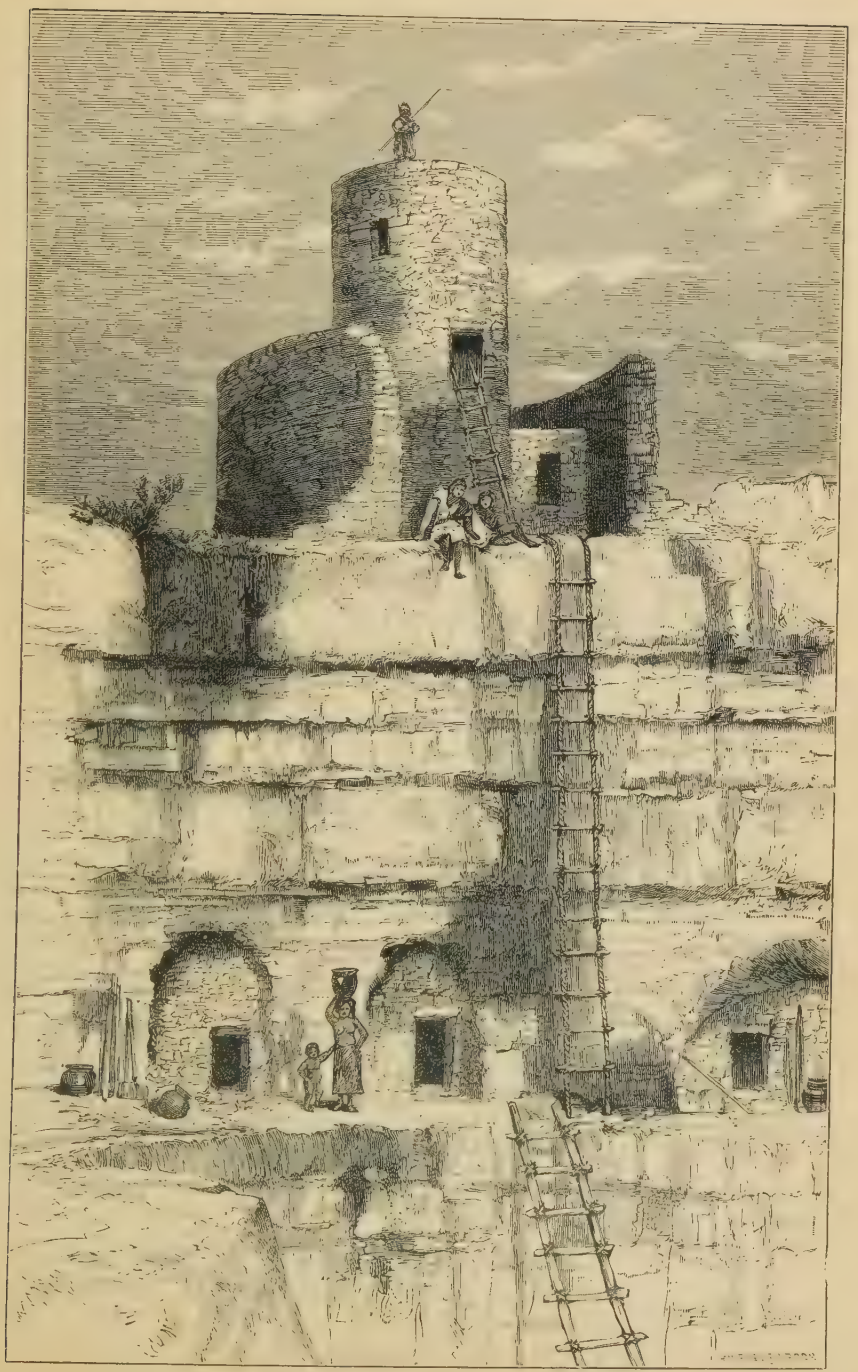
"The elevation of the walls at the present time is thirty-two feet, showing it to have been originally four stories high; the ground-plan, in exterior development, is four hundred and thirteen feet. On the ground-floor are fifty-four apartments, the smallest one measuring five feet square, the largest one thirteen feet by seven. These rooms communicate with each other by means of small doors, two and a half feet wide by three feet high.

"In the second story the doors are much larger; in this, as in the third story, were once windows. The system of flooring was unhewn beams about six inches in diameter, from which the bark had been carefully removed; they were laid transversely from wall to wall, small, peeled sticks about one inch in diameter being laid across them; these were covered with grass or *tulle*, which, with a layer of mud mortar, furnished the floor to the room above. These beams show no signs of the saw or axe, but bear the marks of having been hacked off by some very imperfect instrument.

"In different portions of the ruins were three circular apartments sunk in the ground, the walls being of masonry; these apartments measured from three to twenty-seven feet in diameter, and were about six feet in the clear, were called *estufas*, and were used for the performances of the ceremonies and rites of their religion, the only entrance to them being through a small door in the top, which also admitted the light."

CLIFF-DWELLERS.

We now come to the cliff-dwellers, the most remarkable and mysterious of all the ancient races. "In an encampment, one thousand feet above the valley of the Rio Mancos, are single houses, groups of two and three, and villages, according to the width of the shelf they occupy. They are so high that the naked eye can distinguish them merely as specks. There is no possible access to them from above on account of the rocks that project overhead; no present way of reaching them below, although doubling paths and foot-holes in the



RESTORED TOWER AND CLIFF-HOUSES.

rocks show where the way has been of old trodden by human feet. A few houses are two stories, — one showed four stories, — but generally they are not higher than a man's head; division walls are built, beginning at the back of the opening and working outward to the front of the cave, which is so neatly walled by masonry of the prevailing stones that the artificial work is scarcely noticeable by a casual observer. Upon the summits of the loftiest battlements are placed at irregular intervals round stone towers, supposed to have been signal-towers."

The full-page illustration furnishes a good view of cliff-houses and round tower as seen in the valley of the Rio Mancos and other localities. Holmes says: "The cliff-houses conform in shape to the floor of the niche or shelf on which they are built. They are of firm, neat masonry, and the manner in which they are attached or cemented to the cliffs is simply marvellous. Their construction has cost a great deal of labor, the rock and mortar of which they are built having been brought for hundreds of feet up the most precipitous places."

In describing the scene illustrated by the cut, Holmes adds: —

"In one place in particular, a picturesque outstanding promontory has been full of dwellings, literally honeycombed by this earth-burrowing race; and as one from below views the ragged, window-pierced crags, he is unconsciously led to wonder if they are not the ruins of some ancient castle, behind whose mouldering walls are hidden the dread secrets of a long-forgotten people; but a nearer approach quickly dispels such fancies, for the windows prove to be only the doorways to shallow and irregular apartments, hardly sufficiently commodious for a race of pigmies. Neither the outer openings nor the apertures that communicate between the caves are large enough to allow a person of large stature to pass, and one is led to suspect that these nests were not the dwellings proper of these people, but occasional resorts for women and children, and that the somewhat extensive ruins in the valley below were their ordinary dwelling-places. On the brink of the promontory above stands the ruin of a tower, still twelve feet high, and similar in most respects to those already described. These round towers are very numerous in the valley of the Mancos. From this point alone at least three others are in view, some on the higher promontories, others quite low, within twenty or thirty feet of the river-bed. I visited and measured seven along the lower fifteen miles of the course of this stream. In dimensions they range from ten to sixteen feet in diameter, and from

five to fifteen feet in height, while the walls are from one to two feet in thickness. They are in nearly every case connected with other structures, mostly rectangular in form. At the mouth of the Mancos, however, a double circle occurs, the smaller one having been the tower proper. It is fifteen feet in diameter, and from eight to ten in height. The larger circular wall is forty feet in diameter, and from two to four feet high, and is built tangent to the smaller."

This cut shows a cliff-dweller's house in a rock, a marvellous piece of enterprise and ingenuity. As much at home among the mountain cliffs as the eagles, this persistent people seemed to court difficulties and dangers. With few and poor tools to labor with, their example of heroic endeavor and perseverance comes down to us over the centuries to inspire noble effort, as the house in the rock proves.

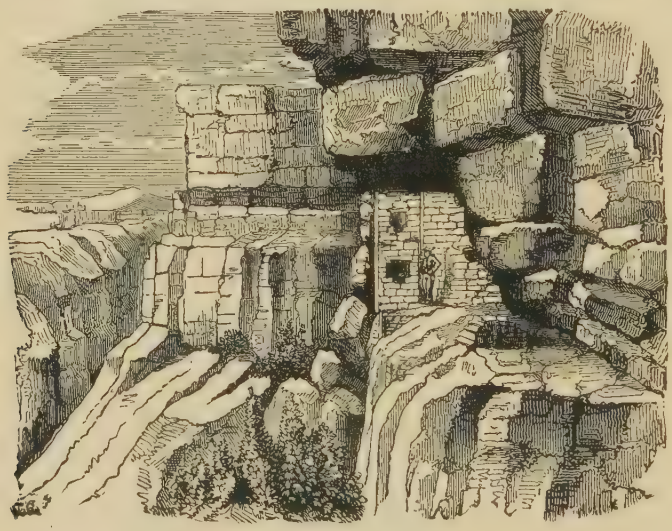
HOUSE IN A ROCK OF MONTEZUMA CAÑON.

The cut on the following page is an excellent sketch of what Jackson discovered, and named the "Two-Storied Cliff-House," on the banks of the Rio Mancos. It is situated seven hundred feet above the level of the river, and is well preserved. One of the rooms measures nine feet by ten; another is six feet square; while the height of the building is twelve feet. There is a space of two or three feet between the walls; and the rocks above form a roof overhanging it. The inside walls of the rooms were covered with several coatings of clay moistened with

water. Here, again, was ample proof that the mortar was laid on with the hand, for the imprint of fingers was distinct.

Mr. Jackson furnishes the following description of a ruin, quite different from the one last mentioned, and more accessible. He discovered it on the banks of the Rio San Juan: —

"About twelve miles below the Montezuma we discovered, far away upon the opposite side of the river, a great circular cave, occupying very nearly the entire height of the bluff in which it occurred, and in which, by close inspection with the glass, we were enabled to make out a long line of masonry. Fording the river, and approaching it, we found that the old bluff-line at this place was a little over



TWO-STORIED CLIFF-HOUSE.

two hundred feet in height, the upper half a light-colored, firm, massive sandstone, and the lower a dark red and shaly variety. The opening of the cave is almost circular, two hundred feet in diameter, divided equally between the two kinds of rocks, reaching, within a few feet, the top of the bluff above and the level of the valley below. It runs back in a semi-circular sweep to a depth of one hundred feet; the top is a perfect half-dome, and the lower half only less so from the accumulation of *débris* and the thick brushy foliage; the cool dampness of its shadowed interior, where the sun never touches, favoring a luxuriant growth. A stratum of harder rock across the central line of the cave has left a bench running around its entire half-circle, upon which is built the row of buildings which caught our

attention half a mile away. The houses occupy the left-hand or eastern half of the cave, for the reason, probably, that the ledge was wider on that side; and the wall back of it receded in such a manner as to give considerable additional room for the second floor, or for the upper part of the one-story rooms. It is about fifty feet from the outer edge of the cave to the first building, a small structure sixteen feet long, three feet wide at the outer end, and four at the opposite end; the walls, standing only four feet on the highest remaining corner, were nearly all tumbled in. Then came an open space, eleven feet wide and nine deep, that served probably as a sort of workshop. Four holes were drilled into the smooth rock floor, about six feet equidistantly apart, each from six to ten inches deep, and five in diameter, as perfectly round as though drilled by machinery. We can reasonably assume that these people were familiar with the art of weaving, and that it was here they worked at the loom, the drilled holes supporting its posts. In this open space are a number of grooves worn into the rock in various places, caused by the artificers of the little town in shaping and polishing their stone implements.

"THE MAIN BUILDING.

"The main building comes next, occupying the widest portion of the ledge, which gives an average width of ten feet inside; it is forty-eight feet long outside, and twelve high, divided inside into three rooms, the first two thirteen and a half feet each in length, and the third sixteen feet, divided into two stories, the lower and upper five feet in height. The joist-holes did not penetrate through the walls, being inserted about six inches — half the thickness. The beams rested upon the sloping back-wall, which receded far enough to make the upper rooms about square. Window-like apertures afforded communication between each room all through the second story, excepting that which opened out to the back of the cave. There was also one window in each lower room, about twelve inches square, looking out toward the open country; and in the upper rooms several small apertures, not more than three inches wide, were pierced through the wall — hardly more than peep-holes.

"THE ROOM DIVISIONS.

"The walls of the large building continued back in an unbroken line one hundred and thirty feet farther, with an average height of eight feet. The space was divided into eleven apartments, with

communicating apertures between them. The first room was nine and a half feet wide, the others dwindling gradually to only four feet in width at the other extremity. The rooms were of unequal length, the following being their inside measurements, commencing from the outer end, viz.: Twelve and a half, nine and a half, eight, seven and a half, nine, ten, eight, seven, seven, eight, thirty-one feet; the ledge then runs along fifty feet farther, gradually narrowing, where another wall occurs crossing it, after which it soon merges into the smooth wall of the cave. The first of these rooms had an aperture large enough to crawl through, leading outward; the wall around it had been broken away so that its exact size could not be determined; all the others, of which there were about two to each room, were mere peep-holes, about three inches in diameter, and generally pierced through the wall at a downward angle. No sign of either roofing or flooring material could be found in any of the rooms. Everything of that kind has been thoroughly burned out or removed, so that not a vestige of wood-work remains. We cannot be positively certain that they had ever been roofed, the mild temperature of this region hardly necessitating any other covering than such as the ample dome of the cave itself offered.

"In the central room of the main building we found a circular basin-like depression, thirty inches across and ten deep, that had served as a fireplace, being still filled with the ashes and cinders of aboriginal fires, the surrounding walls being blackened with smoke and soot. This room was undoubtedly the kitchen of the house. Some of the smaller rooms appear to have been used for the same purpose, the fires having been made in the corner against the back-wall, the smoke escaping overhead.

"ANCIENT MASONRY.

"The masonry displayed in the construction of the walls is very creditable; a symmetrical curve is preserved throughout the whole line, and every portion perfectly plumb; the sub-divisions are at right angles to the front. The stones employed are of the size used in all similar structures, and are roughly broken to a uniform size. More attention seems to have been paid to securing a smooth appearance upon the exterior than the interior surfaces, the clay cement being spread to a perfectly plane surface, something like a modern stucco finish. In many places, of course, this had peeled away, leaving the rough, ragged edges of the stones exposed.

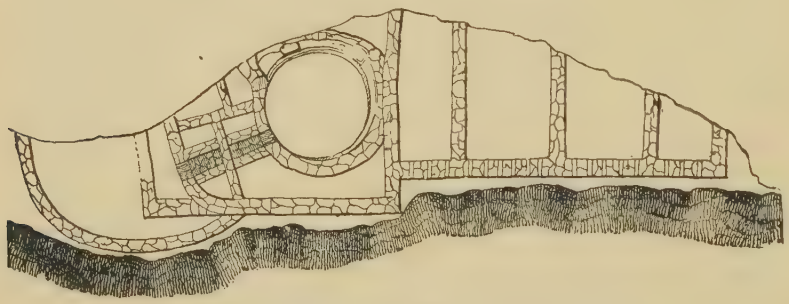
"On the inner walls of some of the sub-divisions that appear to have been used less than others, the impressions of the hands, and even the delicate lines on the thumbs and fingers of the builders, were plainly retained; in one or two cases a perfect mould of the whole inner surface of the hand was imprinted in the plastic cement. They were considerably smaller than our own hands, and were probably those of women or children. In the mortar between the stones several corn-cobs were found imbedded, and in other places the whole ear of corn had been pressed into the clay, leaving its impression; the ears were quite small, none more than five inches long. In the rubbish of the large house some small stone implements, rough indented pottery in fragments, and a few arrow-points were found. It is a wonder that anything is found, for it is more than likely that every house has been ransacked time after time by wandering bands of Utes and Navajos, who would search with keen eyes for any articles of use or ornament left after the first spoliation.

CLIFF-HOUSE ON THE MANCOS.

"The whole appearance of the place and its surroundings indicates that the family or little community who inhabited it were in good circumstances and the lords of the surrounding country. Looking out from one of their houses, with a great dome of solid rock overhead, that echoed and re-echoed every word uttered with marvellous distinctness, and below them a steep descent of one hundred feet to the broad fertile valley of the Rio San Juan, covered with waving fields of maize and scattered groves of majestic cottonwoods,

these old people, whom even the imagination can hardly clothe with reality, must have felt a sense of security that even the incursions of their barbarian foes could hardly have disturbed."

The cut (p. 153) represents cliffs or palisades, two hundred feet high, rising almost perpendicularly. About one-third of the distance upward, in a recess made by the weather, is a cliff-house, sixty feet long by about fifteen at its widest part. The walls are a foot thick and flush with the edge of the precipice. They are erected with skill, the angles are regular, the lines do not diverge from the perpendicular, and, when the difficulties the builder had to contend with in laying his foundations in such a position and at such a height are taken into account, these aerial dwellings may well excite our admiration. A people who would undertake a work of so much labor, with almost insurmountable difficulties before them, must have possessed some of the most reliable traits of character.



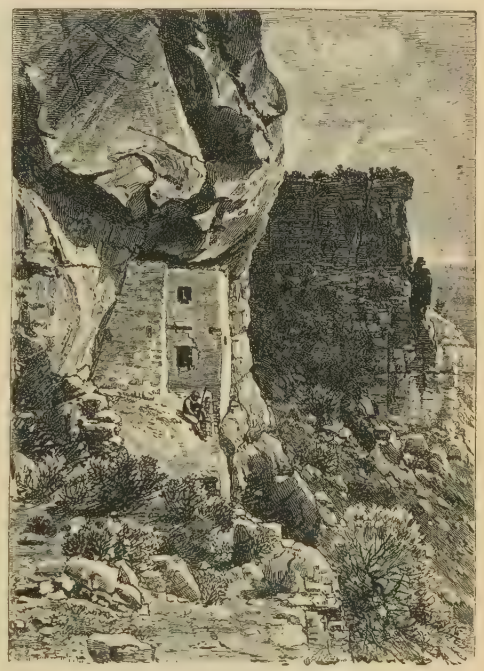
GROUND-PLAN OF LAST-NAMED CLIFF-HOUSES.

Forty or fifty feet above the cliff-house described is another of equal dimensions, perhaps one hundred and twenty-five feet from the river. Holmes says of the extraordinary situation of these houses, "Whether viewed from below or from the heights above, the effect is almost startling, and one cannot but feel that no ordinary circumstances could have driven a people to such places of resort."

The ground plan of the cliff-houses just described will give the reader a clearer view of their construction and magnitude. As the sketch shows, the rooms were separated by division walls, which, however, did not reach to the rock-roof. The passage from one room to another was accomplished by ladders reaching to the top of the partition walls.

The circle in the centre represents the inevitable *estufa*, which is found in all the buildings examined. To what this room was devoted has been a mooted question among explorers; but the most reason-

able view appears to be that it was consecrated to sacred use, and designed for worship. It is supposed that the people were sun-worshippers, and that, within this singular apartment, their more singular rites were performed. This view is confirmed by the fact that the room is cut off from the others, so that the only way of entrance is through a tube of solid masonry about twenty-two inches in diameter, and in this particular case, thirty feet in length. Through this contracted space a person was obliged to crawl as if the act were a penance belonging to the rite to be performed within the *estufa*. In other buildings the tube leading to the estufa was ten, fifteen, and twenty feet in length.



CLIFF-DWELLINGS, MANCOS CAÑON.

The Montezuma Valley, which is ten miles wide in some places, is covered with ruins. The cliffs overhanging the valley are dotted with caves and rock-shelters, which the population turned to account. Holes were discovered, cut in the solid rock at regular distances for the hands and feet in the perilous ascent to these habitations. The forests could not have furnished timber long enough for ladders to reach these lofty abodes. The houses were not as numerous here as in the valley of the Hovenweep, where, "on a natural terrace measuring scarcely three hundred feet by fifty, the cliff-dwellers had managed to erect no less than forty different houses."

The above is another cliff-house similar to the last one described, situated on the Rio Mancos River, in Southwestern Colorado. It was discovered by W. H. Holmes, of the United States Survey, in 1876; and he says: —

"So cleverly are these houses hidden away in the dark recesses, and so very like the surrounding cliffs in color, that I had almost

completed the sketch of the upper house before the lower, or 'sixteen-windowed' one was detected. They are at least eight hundred feet above the river. The lower five hundred feet is of rough cliff-broken

CLIFF-HOUSE IN THE CAÑON DE CHELLY.

slope, the remainder of massive, bedded sandstone, full of wind-worn niches, crevices, and caves. Within one hundred feet of the cliff-top, set deep in a great niche, with arched, overhanging roof, is the upper

house, its front-wall built along the very brink of a sheer precipice. Thirty feet below, in a similar but less remarkable niche, is the larger house, with its long line of apertures, which I afterward found to be openings intended rather for the insertion of beams than for windows."

The drawing (page 156) is a cliff-house two miles from Cave Town. It is built at a height of seventy feet, and is reached by steps cut in the rock. "The house is one story high; the ground-floor measures eighteen feet by ten, and this narrow space forms two separate rooms, whilst the first story consists of only one. The overhanging rock serves as a protecting roof." If the house were built for defence chiefly, it was a success. Arrows could not reach it from below, and no enemy would be so foolhardy as to attempt to reach it by the steps cut in the rock. Arrows from above would have pierced his heart by the time he accomplished half the distance.

The difficulties in the way of explorers are well set forth by Mr. Jackson, in the following account of climbing to one of these human eyries in Southwestern Colorado. The party were already one thousand feet above the valley, and Mr. Jackson was photographing a cliff-house, when "one of the party, sharper-eyed than the rest, descried, away up near the top, perfect little houses, sandwiched in among the crevices of the horizontal strata of the rock of which the bluff was composed. While busy with my photographs, two of the party started up to scale the height, and inspect this lofty abode. By penetrating a side-cañon some little ways, a more gradual slope was found, that carried them to the summit of the bluff. Now, the trouble was to get *down* to the house, and this was accomplished only by crawling along a ledge of about twenty inches in width, and not tall enough for more than a creeping position. In momentary peril of life, — for the least mistake would precipitate him down the whole of the dizzy height, — our adventurous seeker after knowledge crept along the ledge until the broader platform was reached, upon which the most perfect of the houses alluded to stood. The ledge ended with the house, which was built out flush with its outer edge. This structure resembled in general features the cliff-houses already spoken of. The masonry was as firm and solid as when first constructed; the inside was finished with exceptional care. In width it was about five feet in front, the side-wall running back in a semicircular sweep, in length fifteen, and in height seven feet. The only aperture was both door and window, and about twenty by thirty inches in diameter. Its uniqueness was its position on the face of the bluff. To

the casual observer, it would not be noticed once in fifty times in passing, so similar to the rocks between which it was plastered did it appear from our position on the trail."

Captain Macomb, who commanded an expedition from Santa Fé to Grand River, for the United States Government, examined the ruins of cliff-dwellings in Labyrinth Cañon, and he reported as follows: —

"Two miles below the head of Labyrinth Cañon we came upon the ruins of a large number of houses of stone, evidently built by the Pueblo Indians, as they are similar to those on the Dolores, and the pottery scattered about is identical with that before found in so many places. It is very old, but of excellent quality, made of red clay coated with white, and handsomely figured. Here the houses are built in the sides of the cliffs. A mile or two below we saw others crowning the inaccessible summits — inaccessible except by ladders — of picturesque detached buttes of red sandstone, which rise to the height of one hundred and fifty feet above the bottom of the cañon. Similar buildings were found lower down; and broken pottery was picked up upon the summits of the cliffs overhanging Grand River; evidence that these dreadful cañons were once the homes of families belonging to the great people formerly spread over all this region now so utterly sterile, solitary, and desolate."

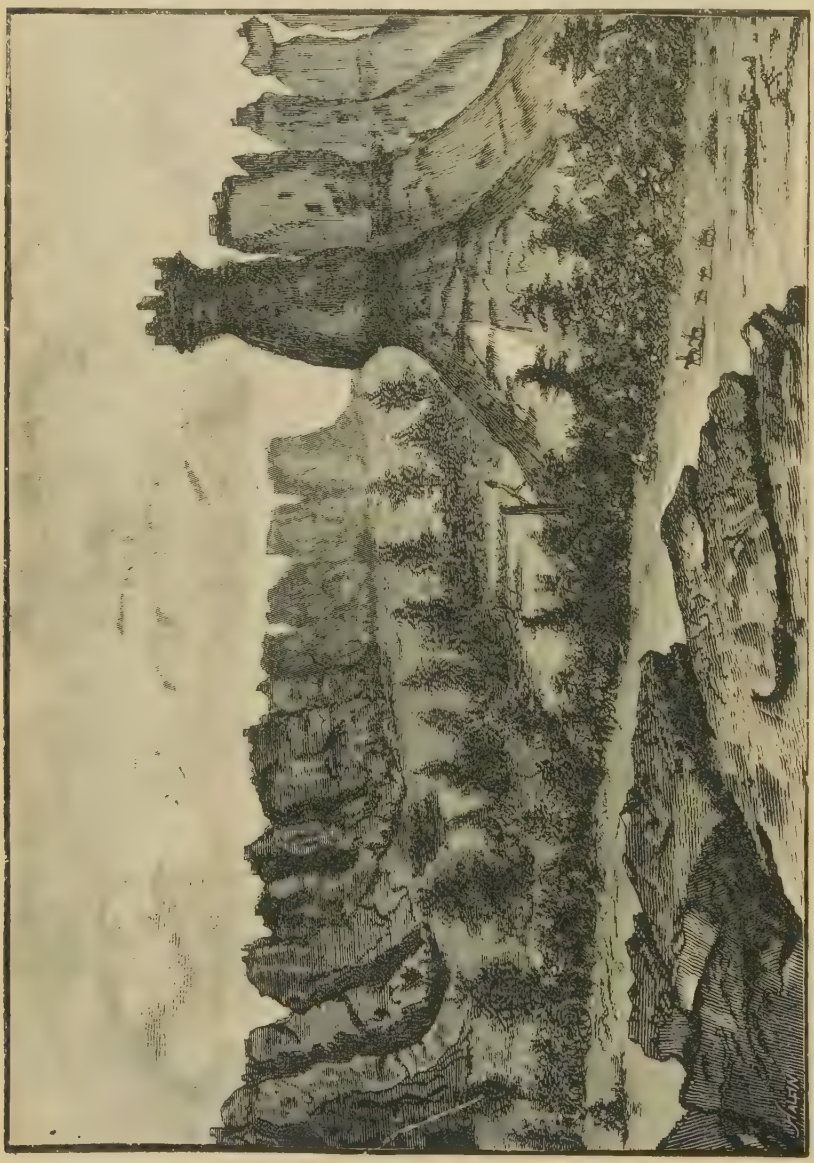
Mr. Crofutt says of the full-page illustration: "It represents a picturesque, outstanding promontory hundreds of feet above the valley, full of dwellings, literally honeycombed by this earth-burrowing race. And as one from below views the rugged, window-pierced crags, he is unconsciously led to wonder if they are not the ruins of some ancient castle, behind whose mouldering walls are hidden the dead secrets of a long-forgotten people; but a near approach quickly dispels such fancies, for the windows only prove to be doorways to shallow and irregular apartments of small dimensions.

"It is hardly probable that these elevated places were the dwellings proper of these people, but occasional resorts for women and children, as a place of safety in times of war and invasion; and that the somewhat extensive ruins in the valley below were their ordinary dwelling-places. On the brink of the promontory above, stands the ruins of a tower, still twelve feet high.

"In another locality, one of the cliff-houses is fully one thousand five hundred feet above the bottom of the cañon, and between three hundred and four hundred feet below the top. Every house appears in perfect preservation, and, when viewed with a field-glass, shows

CLIFF-DWELLINGS, SOUTHERN COLORADO.

the whitewash still on the walls, and its size indicates that the town once contained a thousand or more people. At the bottom of the



CLIFF AND CLIFF-HOUSES.

cliff it was strewn with ruins, evidently fallen from above, and only portions of the houses were standing."

Professor Powell says of these ruins and people: "These cliff-

houses are usually placed on the most inaccessible cliffs ; sometimes the mouths of caves have been walled across, and there are many evidences to show their anxiety to secure defensible positions. Probably the nomadic tribes were sweeping down upon them, and they resorted to these cliffs and caves for safety."

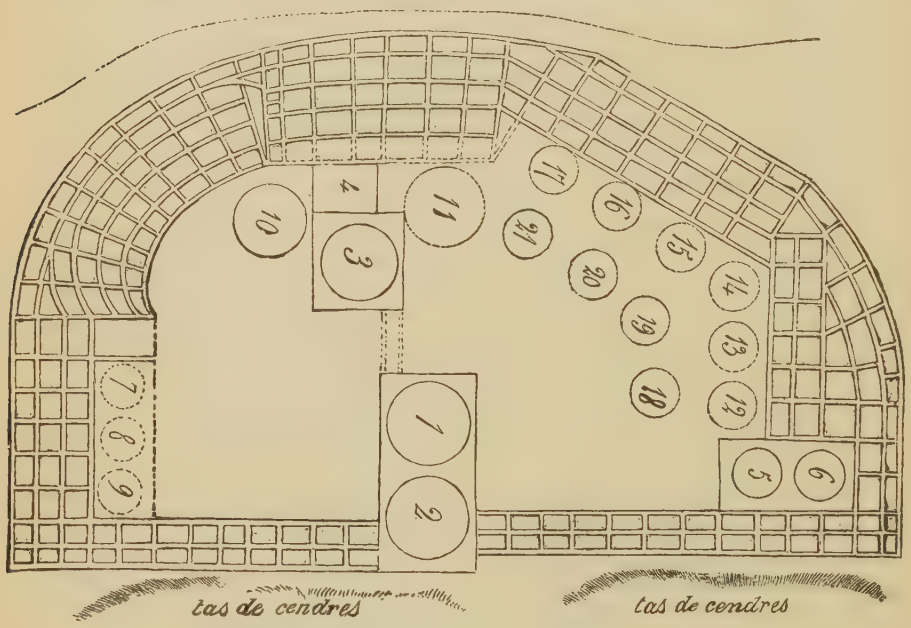
Mr. Crofutt remarks : "The cliffs, on which are to be found many stone buildings, as shown in the illustration, are of all sizes and dimensions, varying in height from a few feet to over one thousand five hundred feet. They are scattered along the sides of the cañons, sometimes only a few feet from the main walls, and in others several hundred yards away — isolated buttes. We are of the opinion they were all, at one time, a portion of the cañon walls, but by the action of the eroding elements for thousands of years, have become detached, and are now a puzzling problem for both the historian and geologist.

"At one point, we are told, twelve miles west from the Ojo Verde, where several cañons unite by the elimination of their dividing walls, and debouch into a comparatively open country, the view westward is over a wide extent of country ; in its general aspects a plain, but everywhere deeply cut with a tangled maze of cañons, and thickly set with towers, castles, and spires of most varied and striking forms — the most wonderful monuments of erosion that eyes ever beheld. Near the *mesa* stand detached portions of it of every possible form, from broad, flat tables to slender cones, crowned with pinnacles of the massive sandstone which form the perpendicular faces of the cañon walls. These castellated buttes are from one thousand to one thousand five hundred feet in height, and no language is adequate to convey a just idea of the strange and impressive scenery formed by their grand and varied outlines. In some localities the surface is diversified by columns, spires, castles, and battlemented towers, of colossal, but often beautiful proportions, closely resembling elaborate structures of art, but in effect far surpassing the most imposing monuments of human skill. In other places are long lines of spires of white stone, standing on red bases, thousands in number, but so slender as to recall the most delicate carving in ivory or the fairy architecture of some Gothic cathedral, many of which were upwards of five hundred feet in height. On the summit of many of these wonderful towers are stone buildings, as represented in the accompanying illustration."

We have not space to represent the remarkable ruins of ancient races which Mr. Jackson found in New Mexico. We can only say,

in addition to what was said on a previous page about mammoth ruins, that Mr. Jackson found ruins of buildings as large as any at Washington except the Capitol.

"One of these, the 'Pueblo del Arroya,' has wings one hundred and thirty-five feet in length, and the western wall of the court is two hundred and sixty-eight feet. Facing the centre of the court are three circular *estufas*, one of thirty-seven feet in diameter and three stories in height. Another, the 'Pueblo Chettro Kettle,' is four hundred and forty feet long and two hundred and fifty feet wide,



GROUND PLAN OF THE PUEBLO BONITO IN THE CHACO CAÑON.

and presents the remains of four stories. The logs forming the second floor extend through the walls a distance of six feet, and probably at one time supported a balcony on the shady side of the house. In the wall running around three sides of the building nine hundred and thirty-five feet in length and forty feet in height, there were more than two million pieces of stone for the outer surface of the outer wall alone. This surface multiplied by the stones of the opposite surface, and also by the stones of the interior or transverse lines of masonry, would give a total of thirty million pieces in three hundred and fifteen thousand cubic feet of wall. These millions of pieces had to be quarried and put in position; the timbers were

brought from a great distance, and considering the vastness of the work and the amount of labor and time that must have been expended, these buildings may well be compared with the most famous works of what is so wrongly called the Old World."

The Pueblo Bonito is another of the mammoth buildings discovered. It is five hundred and forty-four feet long, and three hundred and fourteen wide. It has a capacious inside court divided into nearly equal parts by a row of *estufas*. Mr. Jackson has restored this pueblo to what he supposes to have been its original appearance, and has furnished the ground plan shown on the preceding page.

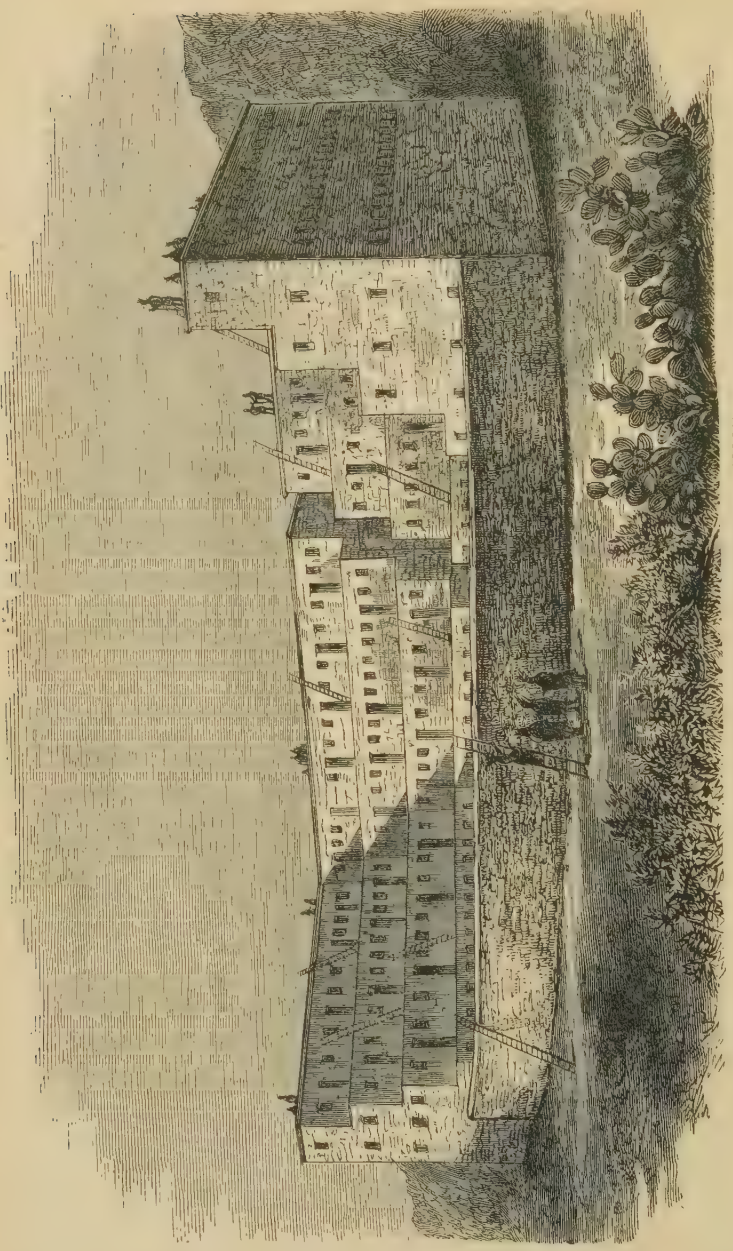
The ruins are in such confusion that it is impossible to tell the exact number of rooms this structure contained. It must have contained more than the Pueblo of Pintado; and one hundred and fifty were counted in the latter. It would not be extravagant to say that the Pueblo Bonito contained two hundred rooms. The drawing gives a good idea of the form and magnitude of the building.

Lieutenant Simpson, of the United States Survey Corps, has done a good thing by furnishing the illustration on p. 164, whereby the reader can understand the form and magnitude of an ancient pueblo, without the least doubt that here was the abode of an enterprising people centuries ago.

The Abbé Dominech is of the opinion that these ruins are of Toltec origin; and that the buildings were erected in the twelfth century. He says: "All these towns are so ancient that no Indian traditions of the present races make any mention of them. The banks of the Rio Verde and Salinas abound in ruins of stone dwellings and fortifications which certainly belong to a more civilized people than the Indians of New Mexico. They are found in the most fertile valleys, where traces of former cultivation and of immense canals for artificial irrigation are visible. The solidly built walls of these structures are twenty or thirty yards in length, by forty or fifty feet in height; few of the houses are less than three stories, while all contain small openings for doors and windows, as well as loop-holes for defence from attacks."

The Abbé continues his observations, and accounts for the extinction of these ancient races, as follows: —

"These vast monuments of New Mexico and Arizona are known to but few travellers; consequently but few writers have speculated about their origin. Certain it is that all the pueblos of this wilderness are of an incontestable homogeneous character; they are the work of a great people, of an intelligent nation, whose civilization



A PUEBLO RESTORED BY LIEUTENANT SIMPSON.

was far superior to that of the actual tribes. But the question is, what became of this vast population who have left the land covered with such numerous and wonderful constructions?

"It is known that all agglomerations of men and families, on settling in a new land, build their dwellings in wooded parts, or near streams, in order to secure these indispensable elements. Many of this population were suddenly deprived of wood and water.

"Perpetual droughts followed the clearing of the woods, compelling the inhabitants of high plateaus to emigrate into the plains; when the rain failed, the wells and cisterns dried up, and the horrors of thirst drove the people from their abodes. Both rivers and their sources dried up. . . .

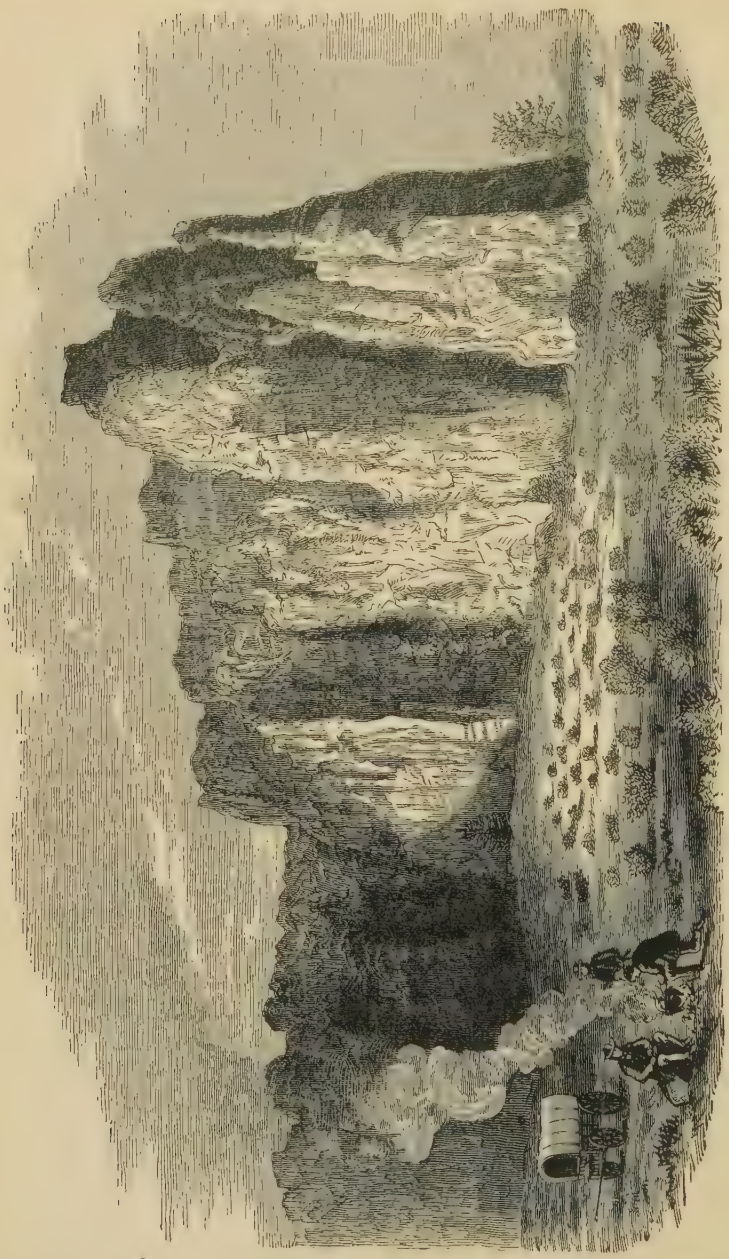
"On the other hand, the soil of these regions is often covered with agate, jaspar, chalcedony, petrified trees, and masses of aranaceous lava, which, descending from the hills, absorb the water of creeks and their sources, fill up the beds of streams, and render lands barren and dry which at one time were watered and fertile.

"When these phenomena take place, the people that dwell in the country are naturally compelled to flee from these newly made deserts, which become the abodes of sickness, famine, and death, and go to seek a more favored land. These compulsory emigrations must have been frequent, to judge from the traces the population have left behind; notwithstanding, the ranks of the emigrants must have been fearfully thinned by exposure, hardships, and misery. . . .

"The Zuñis and other tribes still dwell in pueblos similar to these we have described; and it is probable that to their ancestors the construction of these gigantic edifices ought to be attributed."

The lofty towers of El Moro are called Inscription Rock because they are covered with strange characters, carved by a people who were familiar with them centuries ago. Travellers, too, carved their names thereon nearly a hundred years before the Pilgrims landed at Plymouth. In "1526" Don Joseph de Bazemzellos, whoever he may have been, inscribed his name on this wonderful rock. In "1629" Juan Gonzales carved his name there. Before he came, in 1606, a messenger "passed by the place with despatches." And later still, on "September 28, 1736," Don Martini de Cochea wrote his name there. What business brought travellers there three hundred and fifty years ago, and more, the curious only may conjecture. The mystery becomes more mysterious in consequence of these facts, and the rock more of a marvel, especially when we consider that these travellers found the original inscriptions there, and may have been carved thereon five hundred or a thousand years before.

Thus, in connection with the cave and cliff dwellings are found numerous hieroglyphics, or picture-writing, painted or engraved on

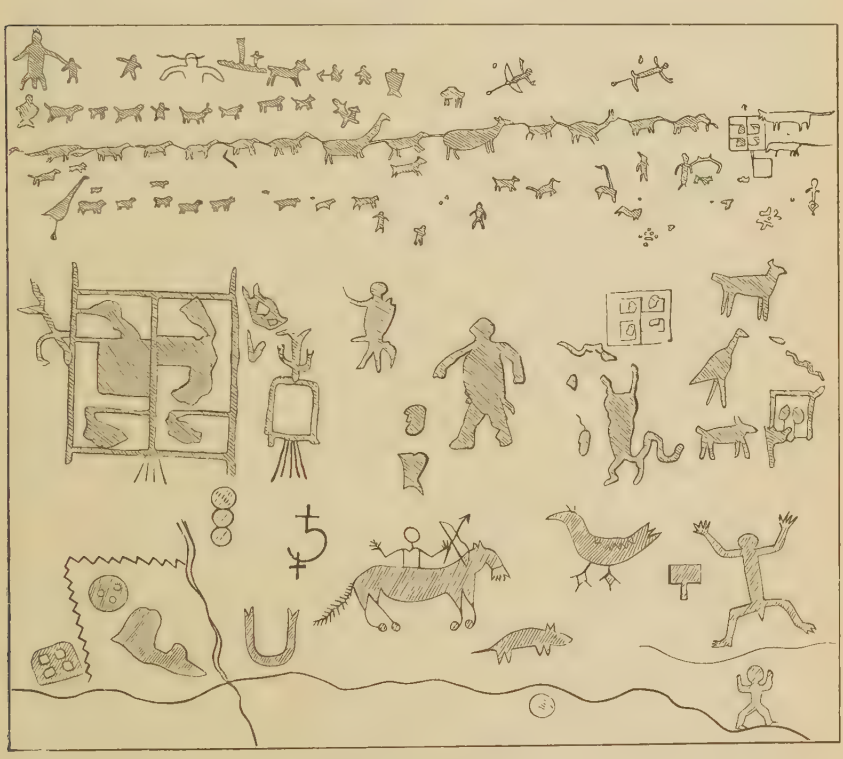


EL MORO, OR INSCRIPTION ROCK.

rocks, supposed to be the work of cliff-dwellers, or some other prehistoric people. That those especially cut in the rock are very ancient cannot be doubted. That they were engraved by men of

more or less intelligence and ambition is equally manifest. Holmes says: "The work on some of the larger groups of inscriptions must have been one of immense labor, and must owe its completion to strong and enduring motives. With a very few exceptions, the engraving bears undoubted evidence of age." As there is no figure of a horse among them, it is presumed that they antedate the introduction of that useful animal into the country.

The following is a good illustration of the rock inscriptions that appear in different parts of the New West: —



ROCK INSCRIPTIONS.

Mr. Holmes's conclusion about the ruins considered is as follows: —

"As to situation, they may be classified under three heads: (1) lowland or agricultural settlements; (2) cave-dwellings; and (3) cliff-houses or fortresses.

"Those of the first class are chiefly on the river bottoms, in close proximity to water, in the very midst of the most fertile lands, and located without reference to security or means of defence.

"Those of the second are in the vicinity of agricultural lands, but built in excavations in low bluff faces of the Middle Crustaceous shales. The sites are chosen, also, I imagine, with reference to security; while the situation of the cliff-houses is chosen totally with reference to security and defence, — built high upon the steep and inaccessible cliffs, and having the least possible degree of convenience to field or water.

"As to use, the position for the most part determines that. The lowland ruins are the remains of agricultural settlements, built and occupied much as similar villages and dwellings would be occupied by peaceful and unmolested peoples of to-day. The cave-dwellers, although they may have been of the same tribe and contemporaneous, probably built with reference to their peaceable occupations as well as to defence; and it is impossible to say whether or not they made these houses their constant dwelling-places. The cliff-houses could only have been used as places of refuge and defence. During seasons of invasion and war, families were probably sent to them for security, while the warriors defended their property or went forth to battle; and one can readily imagine that, when the hour of total defeat came, they served as a last resort for a desperate and disheartened people."

This view of the cliff-dwellers is confirmed by the fact that "corn-rooms," "bean-rooms," "work-rooms," and "fire-rooms," or kitchens, were found in many dwellings. The presence of corn and beans, together with the remains of utensils, denoted the use of the apartments.

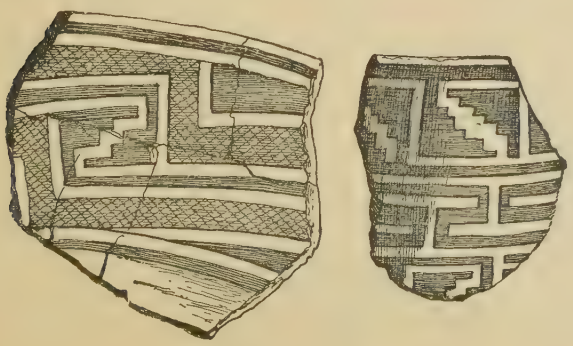
Another factor in the solution of this problem concerning the ancient races, is the existence of pottery throughout the whole region where ruins have been discovered and examined. It has been found in such quantities and variety as to fill explorers with wonder. Mr. Holmes says: "The study of the fragmentary ware found about the ruins is very interesting, and its immense quantity is a constant matter of wonder. On one occasion, while encamped near the foot of the Mancos Cañon, I undertook to collect all fragments of vessels of manifestly different designs within a certain space; and, by selecting pieces having peculiarly marked rims, I was able to say, with certainty, that within ten feet square there were fragments of fifty-five different vessels. In shape these vessels have been so varied that few forms known to civilized art could not be found. Fragments of bowls, cups, jugs, pitchers, urns, and vases in indefinite variety may be obtained in nearly every heap of *débris*." That the makers well understood the decorative art, is evident from the great variety of

beautiful patterns discovered. Mr. Jackson says that one "can see at a glance the proficiency they had attained in its manufacture and ornamentation, displaying an appreciation of proportion, and a fer-

VASES FOUND ON THE BANKS OF THE SAN JUAN.

tility of invention in decoration, that makes us almost doubt their ante-Columbian origin; but, nevertheless, without going into the details, we believe them to antedate the Spanish occupancy of this country, and to owe none of their excellence to European influences, being, very likely, an indigenous product."

This singular people must have possessed original ideas about ornamentation and convenience, judging from their domestic utensils. The cuts on the next page show two of their unique drinking-vessels, one representing a man on horseback. The place for drinking appears to have been in the top of the hat. We can scarcely conceive of a more awkward drinking-vessel to handle, nor one of more original design. It was artistically wrought and beautifully painted. Whether the tail constituted the handle or not does not fully appear. So complicated an affair must have been handled most conveniently by the legs.



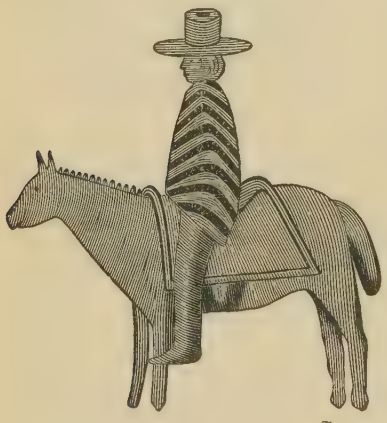
FRAGMENTS OF POTTERY.

The other vessel is nearly as curious, and somewhat more difficult to understand.

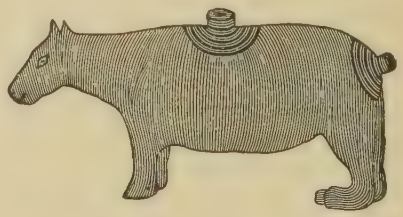
Whether the bottle is filled and emptied through the aperture on the back or hinder extremity is a question, though we suppose it is the one on the back. The reader, however, is permitted to differ from us.

The above must suffice as a sample of the pottery found throughout the ancient ruins. Figures of birds, beasts, reptiles, and animals are used in decorating, together with the most fantastic forms that imagination can invent. The figures on some were painted; on others, carved or raised.

Implements of husbandry were found among the ruins in many places; also stone hand-mills for grinding corn. Arrow-points were numerous about the cliff-houses; and their position indicated that they were hurled against the habitations by an enemy. "It is remarkable that, except for the copper rings found at Pecos, not a weapon or ornament of metal has been found. Were such articles carried off by the Indians, or were the early inhabitants of the pueblos of New Mexico and Colorado ignorant of iron and bronze? This latter hypothesis seems probable, for the roughly squared beams supporting their home appear to have been shaped by stone implements."



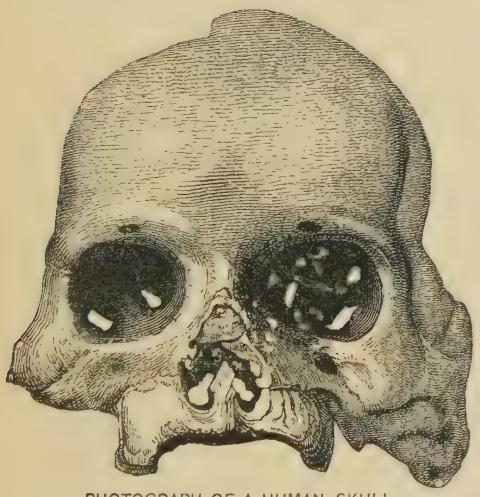
A DRINKING-VESSEL FROM ZUÑI.



A DRINKING-VESSEL FROM OLD ZUÑI.

The remains of human beings have frequently been found among the ruins described. In 1859 the fragment of a human skull was found associated with the bones of the mastodon, in the auriferous gravel of Table Mountain, California, *one hundred and eighty feet* below the surface of the earth. This discovery has been discussed in all the learned societies of this country and Europe. In 1866 Professor Whitney, Director of the Geological Survey of California, discovered a human skull nearly complete, as appears from the photograph of it on the following page, one hundred and thirty feet deep in the earth.

Professor Whitney announced his discovery to Mr. Deser, in the following words: "My chief interest now centres in the human remains, and in the works from the hand of man that have been found in the Tertiary strata of California, the existence of which I have been able to verify during the last few months. Evidence has now accumulated to such an extent that I feel no hesitation in saying that we have unequivocal proofs of the existence of man on the Pacific coasts prior to the glacial period, prior to the period of the mastodon and the elephant, at a time when animal and vegetable life were entirely different from what they are now, and since which a vertical erosion of from two to three thousand feet of hard rock strata has taken place."



PHOTOGRAPH OF A HUMAN SKULL
Found one hundred and thirty feet deep in the earth.

We have simply glanced at the subject of ancient races on the Pacific coast. If we have succeeded in satisfying the reader that the New West was inhabited by man prior to the landing of the Pilgrims, and even prior to the discovery of this continent by Columbus, our object has been accomplished; our first marvel of races has been established. We have seen enough, surely, to satisfy us that there is foundation for the legendary tale which Mr. Jackson's guide in Southwestern Colorado told him, and which Mr. Ingersol published in the New York *Tribune*, as follows:—

"Formerly, the aborigines inhabited all this country we had been over as far west as the head-waters of the San Juan, as far north as the Rio Doures, west some distance into Utah, and south and southwest throughout Arizona and on down into Mexico. They had lived there from time immemorial, — since the earth was a small island, which augmented as its inhabitants multiplied. They cultivated the valley, fashioned whatever utensils and tools they needed very neatly and handsomely out of clay and wood and stone, not knowing any of the useful metals; built their homes and kept their flocks and herds in the fertile river-bottoms, and worshipped the sun. They were an eminently peaceful and prosperous people, living by agriculture rather

than by the chase. About a thousand years ago, however, they were visited by savage strangers from the north, whom they treated hospitably. Soon these visits became more frequent and annoying. Then their troublesome neighbors — ancestors of the present Utes — began to forage upon them, and, at last, to massacre them and devastate their farms; so, to save their lives at least, they built houses high upon the cliffs, where they could store food and hide away till the raiders left. But one summer the raiders did not go back to the mountains as the people expected, but brought their families with them and settled down. So, driven from their homes and lands, starving in their little niches on the high cliffs, they could only steal away during the night, and wander across the cheerless uplands. To one who has travelled these steppes, such a flight seems terrible, and the mind hesitates to picture the suffering of the sad fugitives.

"At the *cristone* they halted, and probably found friends, for the rocks and caves are full of the nests of these human wrens and swallows. Here they collected, erected stone fortifications and watch-towers, dug reservoirs in the rocks to hold a supply of water, which in all cases is precarious in this latitude, and once more stood at bay. Their foes came, and for one long month fought and were beaten back, and returned day after day to the attack as merciless and inevitable as the tide. Meanwhile, the families of the defenders were evacuating and moving south, and bravely did their protectors shield them till they were all safely a hundred miles away. The besiegers were beaten back and went away. But the narrative tells us that the hollows of the rocks were filled to the brim with the mingled blood of conquerors and conquered, and red veins of it ran down into the cañon. It was such a victory as they could not afford to gain again, and they were glad when the long fight was over to follow their wives and little ones to the south. There, in the deserts of Arizona, on well-nigh unapproachable, isolated bluffs, they built new towns, and their few descendants, the Moquis, live in them to this day, preserving more carefully and purely the history and veneration of their forefathers than their skill or wisdom. It was from one of their old men that this traditional sketch was obtained."

PUEBLOS.

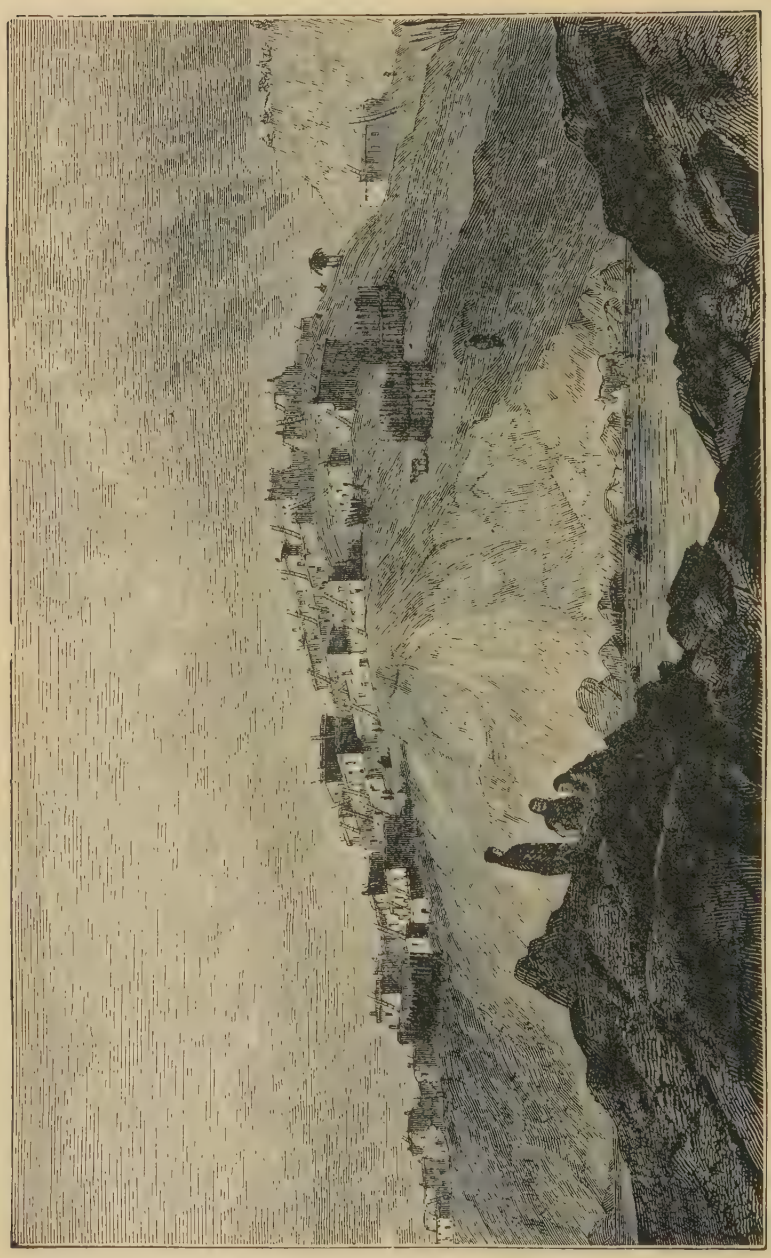
The Pueblo, Zuñi, and Moquis Indians are descendants of the cliff-dwellers. Their dwellings, occupations, dress, customs, habits, and worship all bear witness to this fact. Hence, some under-

standing of these tribes is necessary to confirm previous statements concerning ancient races. One writer states the genealogy as follows, speaking of Arizona: —

"Arizona has a history that has never been written. It is only told by the inscribed rocks, the empty irrigating canals, the ruins of populous towns, vacant cliff-dwellings, deserted pueblos, and broken pottery found in so many parts of the Territory. Before the European saw this continent two races had lived and died in Arizona. Near Cosnino, on the Atlantic & Pacific Railroad, there is a cañon two thousand feet deep, which is one hundred yards wide at the bottom and three hundred at the top. Along the walls ledges project outward from ten to twenty feet. Between these, seven tiers of cliff-dwellings can be traced. It is two hundred feet from the bottom of the cañon to the lower tier. The front and side walls are of solid masonry and are yet well preserved. How many thousands of years have elapsed since the cliffs were occupied no man can know. Between that age and the white man came the race who built the canals and farmed the valleys. Perhaps the most extensive of their ruins are at Casa Grande, in the Gila Valley, six miles below Florence and five miles south of the river. When first found by the white man, some three hundred and fifty years ago, the largest building was four stories high and had walls six feet thick. A hundred years ago one house still remained which was four hundred and twenty by two hundred and sixty feet. The walls are of a concrete made of mud and gravel, held together by a hard cement. The inner surface was coated by this cement and is hard and smooth to-day. The ruin is now but fifty by thirty feet and will soon be a mere mound. In the vicinity there is an irrigating canal which has been followed to the Gila, forty miles distant. This proves that an immense body of land was cultivated by this people. In all parts of the Territory are ruins of a similar character, though many are of stone. It is impossible to say positively just who those people were and where they went.

"The cliff-dwellers disappeared, and then came the men who dug the irrigating canals. It is highly probable that this semi-civilized people were driven out by the marauding Apaches whom the Spaniards found in Arizona. We only know that the three races had made this their home ere the Spaniards came."

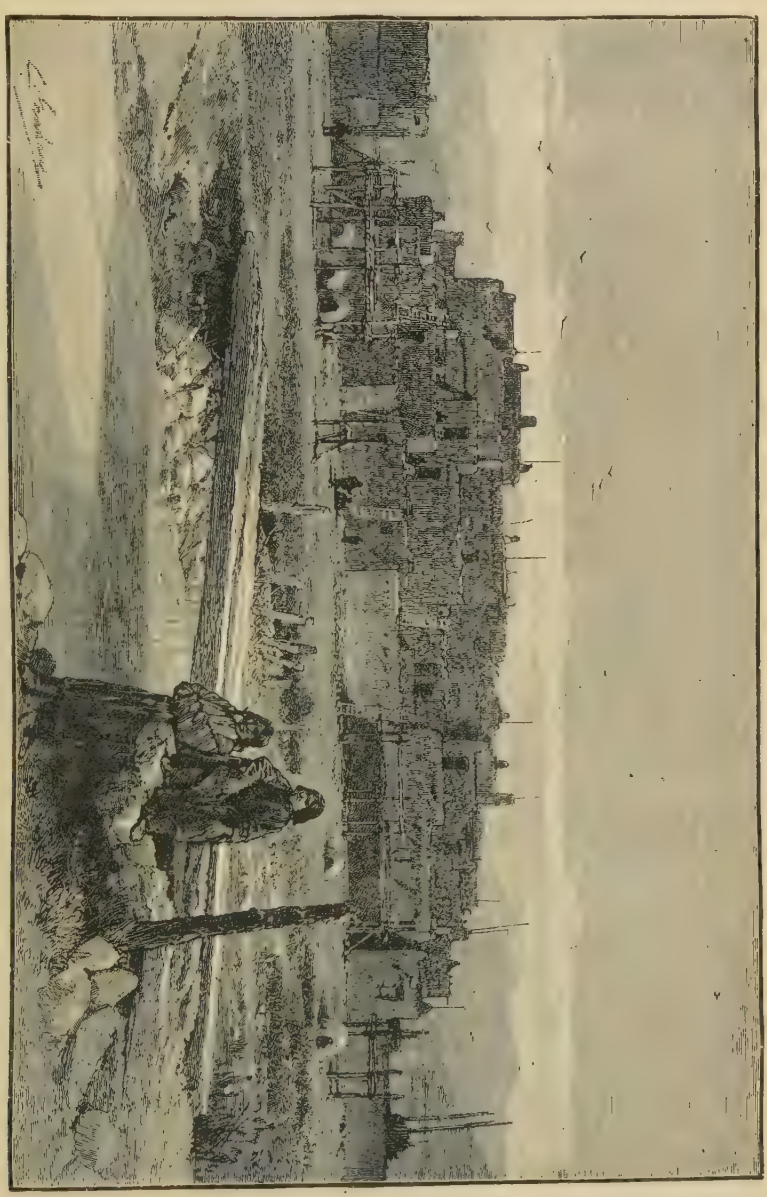
"Pueblo" is the Spanish name for town or village. There are twenty-six of these Indian pueblos in New Mexico and Arizona, nineteen of them in the former Territory and seven in the latter. Nine



PUEBLO OF LAGUNA.

of them are on the line of the Denver & Rio Grande Railway, or near by it, viz.: Taos, Picario, San Juan, Santa Clara, San Ildefonso, Pojungue, Irambe, Cuyamanque, and Tesugue. Cortez found them

here three hundred and fifty years ago, much more civilized than the nomadic tribes around them, as they are to-day. They cultivate the



On Line of D. & R. G. Railway.

PUEBLO OF TAOS, NEW MEXICO.

soil and live in fortified towns or villages, as represented by the illustration. Their dwellings are made of adobes. The cut gives an

excellent view of the Laguna pueblo, in which the presence of ladders indicates to the reader that the dwellings are entered at the top. Adobes make impregnable walls. In the Mexican War, General Scott said "that the ordinary adobe house was a pretty good fortress. Entering them at the top, and then hauling up the ladders, furnished inhabitants with the best security against their enemies."

Generally a square, or plaza, is found in the centre of the pueblos, the habitation being built around it. All pueblos are very much alike. The walls of the buildings are from two to four feet thick, and the roofs are constructed of timbers covered with dirt a foot or more thick. One who has examined them closely says: "Many houses are two, and some even four and five stories, or rather terraces, in height, each successive story being set back some twelve or fifteen feet from the side-walls of the next story below. The usual manner of entering these dwellings is by ascending a ladder outside the building to the roof, and through a hole descending to the interior by another ladder; though some, as a very modern improvement, have doors cut through the side-walls. This method was doubtless adopted as a defensive measure during troublesome times, when it was often necessary to convert the pueblo into a fortress from which to repel hostile invasions."

The Pueblo of Taos furnishes an illustration of what the writer just quoted means by "terraces." We believe that "terraces" is the word rather than "stories." Some explorers describe them as houses built in tiers one story high, but on three, four, and five terraces, one above another; and they call the whole cluster together, "community house."

The Pueblo of Taos is considered one of the most interesting of the whole twenty-six. It consists of two communistic houses, each one five stories high; or, rather, built on five terraces, one above the other. There are seven circular mounds built around the pueblo, supposed to be sweating-chambers, or some sort of Turkish bath, which this singular people used. One of them was used for a council chamber, without doubt; and there, too, their religious rites were performed.

Apart from the town, and yet in close proximity to it, are the ruins of a Catholic cathedral, presenting to the tourist a very interesting subject for examination and study. It must have been a structure of considerable magnificence, especially for that time and that people. The ruins indicate a building of large proportions and very substantial. Architecture must have been one of the arts with

which the inhabitants were familiar. Pottery was another; proofs of which lie scattered among the ruins everywhere.

On top of many of the houses is the adobe oven; though it often stands by itself apart from the house. The illustration represents the latter.

Professor Zahm has personally inspected several pueblos, and therefore speaks authoritatively of the houses of this curious people, as well as of the form and durability of their dwellings. He says:—

"One of the first things to attract the attention of the visitor on entering their houses, is the large number of glass mirrors that adorn the walls. I remember counting no fewer than seven — and good-sized ones they were — in one room. An object of special interest, too, in every pueblo, is the estufa, or council chamber. The one in Isleta is a circular structure of adobe without windows, forty feet in diameter, and fifteen feet in height, with only one entrance, and that through the roof. The church is quite a large building, and in a good state of preservation. Like all the other buildings in the town, it is made of adobe, and has walls six feet thick.

ADOBE OVEN.

"The pueblos of San Juan, Taos, San Domingo, Zuñi, Acoma, and others, throughout New Mexico and Arizona, are, in appearance, essentially the same as that of Isleta. In Isleta, however, the houses are scarcely ever more than one story high, and are entered by doors in the side, whilst the houses of other pueblos are frequently several stories in height, to which entrance is obtained by ascending ladders, and passing down through a hole in the roof. Men, women, and children, cats and dogs, may be seen rapidly running up and down these ladders when going into and coming out of these curious dwellings.

"It is said that these houses were constructed in this fashion to serve the purpose of fortresses, in case of an attack from an enemy. When attacked, the inhabitants raise all the ladders, thereby cutting off all possibility of entrance to their habitations; and, as they are

generally well provisioned, they are prepared to withstand a long siege. But you may say that such structures may do well enough against a shower of Indian arrows, but that they would never withstand bullets and cannon-balls. The experience, however, in the Mexican war of 1846, will tell you differently. If what we know of resisting power of ordinary earthworks were not sufficient to convince us of the strength of the thick adobe walls of Pueblo dwellings, the actual tests made, time and again, of their strength should remove all doubt about the matter. It has been found, as a matter of fact, that a wall

THE OLDEST HOUSE IN THE UNITED STATES.

of adobes will withstand the batterings of shot and shell almost, if not fully, as well as the rampart of cotton-bales that stood General Jackson in such good stead in the battle of New Orleans.

"In this connection I would also make an observation regarding the durability of these structures of adobe, the material of which, until lately, nearly all the buildings of the Southwest were constructed. It might be thought, at first sight, that they could not withstand the action of the elements for more than a few weeks, or months at most, and that the first rain-storm would wash them away. Such, however, is far from being the case. The oldest house in the United States is built of adobe; and although it has been standing at least since 1540, it is still inhabited, and bids fair to last a century more, and probably longer."

Professor Zahm says the oldest house in the United States is built of adobe. We are able to furnish a view of it engraved from one of Jackson's photographs. It is several hundred years old — an old dwelling when the Pilgrims landed on Plymouth Rock.

This was one of the first habitations erected in Santa Fé, no doubt. Originally it was destitute of door or window in the side and end — these have been cut within a century. Santa Fé was a town of importance in 1550, when it was settled by the Spaniards. Based on this fact was the "Tertio-Millennial Anniversary" there, in 1883, when the place was visited by representatives from every State and Territory, and from other nations as well. The appearance of the building indicates that it was standing when the Spaniards took possession of the place.

"THE ADOBE PALACE."

Old Government House at Santa Fé, erected 1600.

Having seen the oldest adobe house, it may be well to exhibit the best one. So far as we know, "The Adobe Palace" of Santa Fé is the best; and it was erected in 1600, so that its age is a matter of considerable interest. It was built for the first governor when Santa Fé, which is the oldest town in the United States, was the capital and centre of the Pueblo Kingdom. It was named Palacio del Gobernador; and it was occupied by the first governor — Pedro de Peralto — in 1600. "The building itself has a history as full of pathos

and stirring incident as the ancient fort of St. Augustine, and is older than that venerable pile. It had been the palace of the Pueblos immemorially before the holy name Santa Fé was given in baptism of blood by the Spanish conquerors; palace of the Mexicans after they broke away from the crown; and palace ever since its occupation by El Gringo. In the stormy scenes of the seventeenth century it withstood several sieges; was repeatedly lost and won, as the white man or the red held the victory." [1]

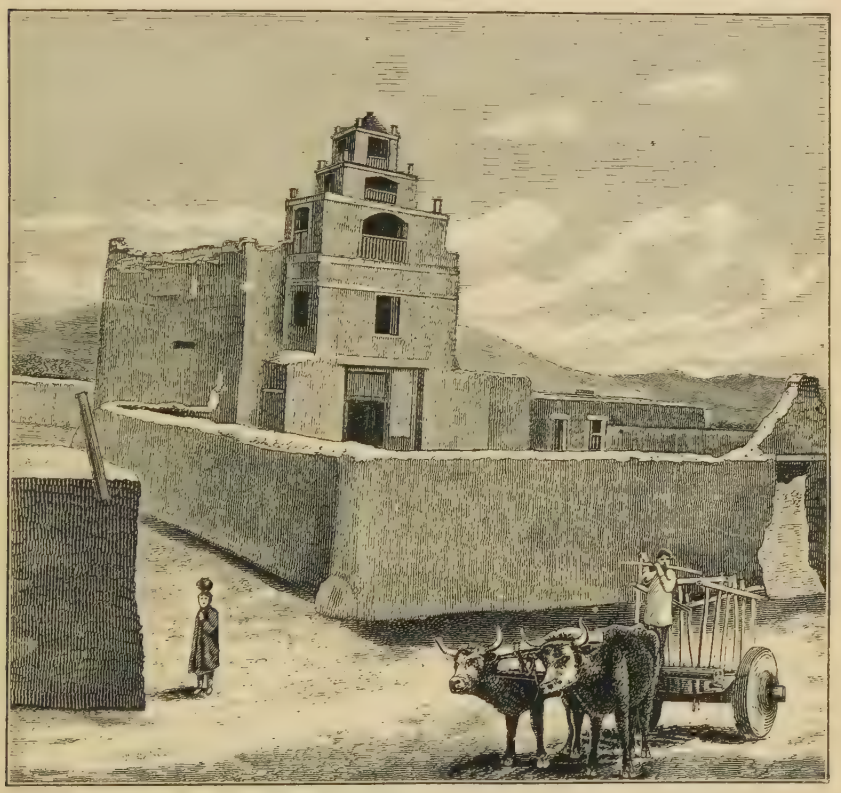
When the United States Government took possession of the town, in the late war of the Rebellion, General Lew Wallace occupied this palace; and there Mrs. Wallace wrote her valuable articles concerning the Pueblos. The latter were loyal to our government.

We have said that in nearly all the pueblos, the adobe buildings were erected around a plaza, or park. It was so in Santa Fé. The beautiful plaza, with adobe houses in good condition built around it, appears as when Coronado passed through the pueblo almost three hundred and fifty years ago. During all this time little change has been wrought in Santa Fé, except what our Christian civilization has made within a few years. The ancient part of the town is substantially the same. It is a very interesting scene, — the ancient and modern civilizations side by side, as it is, not only in Santa Fé, but as we saw it in other parts of New Mexico. A terse writer says: —

"Here are three civilizations side by side. The Pueblo Indians, the descendants of the powerful Aztecs, present the aboriginal civilization, just as Cabeza de Vaca found it three hundred and fifty years ago. Their houses, manners, and customs are the same now as then, and theirs is the oldest type of American civilization of which we have any knowledge. Then, there is the Spanish population. Practically cut off from the rest of the world for hundreds of years, they present in a crystallized form the life of the seventeenth century in the latter part of the nineteenth. These people present to-day the generosity, hospitality, and high-spirited chivalric feeling of the old days of Castile. The quiet, easy life of the Pueblo and the Spaniard ran smoothly side by side with no perceptible change, secure in the isolation of distance, till suddenly the new civilization of the nineteenth century, borne along by the swift and irresistible flight of steam and electricity, 'invaded and overran that hitherto silent and voiceless empire.' A recent traveller through that country expresses it thus: 'The old order, surprised suddenly, has not had time to fly

[1] Mrs. Susan E. Wallace.

or to change, and stands mute in the presence of the new. There stands the sun-browned herdsman, watching his flocks in the valley; here the Mexican woman, with her shawl over her head, looks shyly from the door of her adobe hut, just as she has looked for all time, while the locomotive dashes by them, and the telephone wire is strung over their heads to communicate with ranches forty miles in the interior. There has never been anything like it in the world before.'"



THE OLDEST CHURCH IN AMERICA.

Since we are upon this subject, a view of the oldest church in America will be apropos. It is located at Santa Fé, and, like the oldest house, is built of adobes. It has stood for three centuries, and, though the elements and time have demolished a portion of its tower, the interior is well preserved. There is an oil painting of the Annunciation on one of the interior walls bearing the date "A.D. 1287." It is thought to be one of the oldest paintings in the world. The cut gives a correct representation of the structure.

Modern civilization has created a great contrast by erecting churches with spires; a hotel that cost one hundred thousand dollars; a hospital costing ninety thousand dollars; the Santa Fé Academy, together with the railroad, telegraph, and telephone — enough to startle the ancient race living there by appealing to their superstitious notions.

The Pueblo Tezuque is but eight miles from Santa Fé, and Mrs. Wallace, from whom we have quoted, made herself familiar with the manners, habits, history, and habitations of its people. She found everything just as described by Coronado's secretary in 1541. The women wore the same style of dresses their ancestors wore three hundred years ago. The fashion had not changed even once. Mrs. Wallace gives such a vivid description of one of the girls as to throw much light upon the character of the race. We quote her description.

"There passes my window at this moment a young Indian girl from Tezuque, a village eight miles north of Santa Fé. Like the beloved one of the Canticles, she is dark but comely, and without saddle or bridle sits astride her little *burro* in cool defiance of city prejudice. Always gayly dressed, with ready nod and a quick smile, showing the whitest teeth, we call her the Bright Alfarata, in memory of the sweet singer of the blue Juniata; though the interpreter says her true name is Poy-ye, the Rising Moon. Neither of us understands a word of the other's language, so I beckoned to her. She springs to the ground with the supple grace of an antelope, and comes to me, holding out a thin, slender hand, the tint of Florentine bronze, seats herself on the window-sill, and, in the shade of the *portal* we converse in what young lovers are pleased to call eloquent silence. Her donkey will not stray, but lingers patiently about, like the lamb he resembles in face and temper, and nibbles the scant grass which fringes the acequia. I think his mistress must be a lady of high degree, perhaps the *cacique's* daughter, she wears such a holiday air, unusual with Indian women, and is so richly adorned with beads of strung periwinkles. She wears loose moccasins, 'shoes of silence,' which cannot hide the delicate and shapely outline of her feet, leggins of deer-skin, a skirt reaching below the knee, and a cotton chemise. Her head has no covering but glossy jet-black hair, newly washed with amolé, banged in front, and 'is tricked off behind the ears in the shape of a wheel which resembles the handle of a cup,' — the distinguishing fashion of maidenhood now as it was more than three hundred years ago. Tied by a scarlet cord across her forehead is a pendant of opaline shell, the lining of a muscle shell,

doubtless the very ornament called precious pearl, and opal which dazzled the eyes and stirred the covetous hearts of the first *conquistadores*. Our Pueblo belle wraps about her drapery such as Castenada's maiden never dreamed of, — a flowing mantle which has followed the march of progress. Thrown across the left shoulder and drawn under her bare and beautiful right arm is a handsome red blanket, with the letters U. S. woven in the centre."

PUEBLO AND CART

The above represents another pueblo, furnished more particularly here to show the sort of cart which the Indians use. The wheels are sawed from logs, as has been the custom from time immemorial, affording a very bungling vehicle in comparison with the modern cart of civilization. Carts were not used at all until within sixty years. The *burro* played the part of both horse and cart. "Packing" the animal with his load was done by experts. Not only wood, but almost every sort of merchandise, was carried in this primitive way. All kinds of utensils which this people use were equally primitive. The plough was little better than a crooked stick, similar to the plough of Palestine. Planting and reaping were accomplished with implements equally ancient. And it is substantially so now. We saw these things again and again in New Mexico several years ago.

The *burro* has proved himself to be a very useful animal, not only to Indian people described, but to pioneers generally in the far West. What the elephant is to the desert plains of the East, that has been

PRIMITIVE AGRICULTURE.

the *burro* to the Rocky Mountain region of the West. Strong, obedient, and reliable, he submits to his master in doing very hard work, climbing where horses can never go. He is small, about the size of a very large Newfoundland dog, perhaps a little larger on the average; but he has more strength and endurance than his size indicates. On the whole he is a funny little fellow.

Among the Indian race in question we find nothing like the wheelbarrow, so useful to the laboring class of modern times. The cut on the following page is the nearest approach to it.

We have now devoted as much space as we have to spare to the Pueblo, and must pass to the Zuñi and Moquis, whose claim of direct connection with the cliff-dwellers is even more satisfactory than that of the Pueblos. We will add, however, on the following page, a sketch of another pueblo, — that of Acoma, — on account of its peculiarities.

BURRO LOADED WITH WOOD.

The pueblo of Acoma is built upon a cliff three hundred and fifty feet high, and can be reached only by clambering up the *débris* of fallen rocks, and then following the steps cut in the solid rock up to immense timbers that have been placed near the top. Should these

timbers be precipitated to the base of the cliff, it would be impossible for man to reach the dwellings.

Mr. Cozzens says: "About two o'clock in the afternoon we came in sight of Acoma. It stands upon the top of a rock, at least three hundred and fifty feet above the surrounding plain, and seems from its situation to be almost impregnable. The pueblo can be reached only by means of a staircase, containing THREE HUNDRED AND SEVENTY-FIVE STEPS, cut in the solid rock. At the upper end of this is a ladder eighteen feet long, made from the trunk of a tree, in which notches have been cut for the feet.

AN ANCIENT WHEELBARROW.

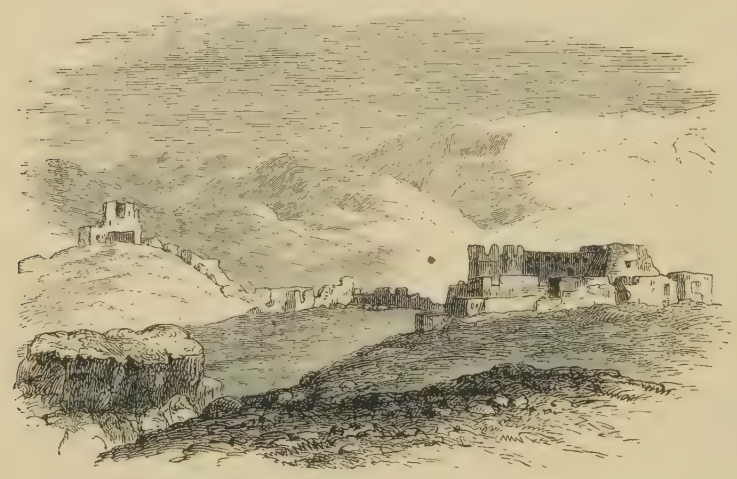
"The town is composed chiefly of blocks, containing sixty or seventy houses each, generally three stories in height. . . . The people seem to be industrious, frugal, and happy. We found them kind and hospitable, and anxious to do whatever might contribute to our comfort. Many of the women would not have been uncomely in appearance were it not for the fact that they padded their legs to an enormous size, thus rendering them anything but attractive.

ACOMA.

"The governor is chosen from the old men by universal suffrage, the only qualification necessary being wisdom. He holds his office during life, and presides over the council, which is composed entirely of old men. The decision of this official is regarded as law in all matters. Next in rank is a war-captain, who arranges all companies and takes charge of every expedition. He also exercises supreme control over all the horses belonging to the pueblo. Then comes the

treasurer, or fiscal chief, who has charge of the council house, church, etc., and who superintends all outlays for repairs, and exercises a supervisory power over all expenditures of whatever nature. The government of Acoma is in many respects similar to that of all the pueblos, and is universally regarded by those most deeply interested in its success, as a very beneficent one."[1]

According to Coronado, Pecos, as represented below, was in ruins in 1540. Later the pueblo was rebuilt, and a church and convent provided; and, two hundred years ago, the population exceeded two thousand. The town was built on an eminence, and was strongly



PECOS.

fortified. Judging from its surroundings, the location was selected because it overlooked the country for many miles, and the approach of enemies could be discovered in season to put the inhabitants upon the defensive.

Cozzens says: "The Indian legend is, that Montezuma built this pueblo himself, and with his own hands placed the sacred fire in the *estufa*, at the same time warning his people that when they allowed it to go out, death would come. Before he left them he took a tall tree, and, inverting it, planted it near the *estufa*, saying, if they did not permit the sacred flame to be extinguished until the tree fell, men with pale faces would come into the country from the east, and, overrunning it, would drive their oppressors, the Spaniards, from the country, when he himself would return and build up his kingdom, the

[1] Three Years in Arizona and New Mexico.

earth should become fertile, and the mountains yield rich harvests of gold and silver. All of which predictions, these Indians claim, have been literally fulfilled."

ZUÑIS.

We are fortunate in having the knowledge of this strange people which Frank H. Cushing has given to the public. Mr. Cushing was sent by the United States government, in 1879, to learn what he could of this tribe, which numbers two thousand. It was expected that he would accomplish his mission and return in about three months. But he has dwelt among this people nearly all the time since. Indeed, he found that it was quite impossible to learn what he desired without becoming a Zuñi himself. So he adopted their dress, mode of living, and methods of worship, in order to be admitted to their most secret conclaves.

At first his presence was clearly annoying to them, especially to their rulers. He used his note-book and sketch-book freely, which seemed to play upon their superstitious notions. Evidently they wanted to destroy these. Mr. Cushing says: —

"When I took my station on a house-top, sketch-books and colors in hand, I was surprised to see frowns and hear explosive, angry expostulations in every direction. As the day wore on this indignation increased, until at last an old, bushy-headed hag approached me, and scowling into my face made a grab at my book and pantomimically tore it to pieces. I was chagrined, but paid no attention to her, forced a good-natured smile, and continued my sketching. Discouraged, yet far from satisfied, the natives made no further demonstrations."

He made slow progress in getting into their good graces. The note-book and sketch-book proved an obstacle to a very intimate acquaintance. Mr. Cushing continues: —

"I was determined not to give them up, but was desirous, so far as possible, of conciliating the Indians. I therefore began with the children. They would scamper up ladders and stand on the roof-tops as I passed, but for all that had a lively curiosity concerning me, and would shout to one another, '*Is-ta-shí, Me-lik-i-a!*' — which I rightly divined was, 'Just look, the little American is coming!' I began carrying sugar and pretty trinkets in my pockets, and whenever I could tempt some of them near with a lump of the rare delicacy, would pat them on the head and give them the pretty trinkets,

or even take the less shy and dirty of them in my arms. I grew in their favor, and within a few days had a crowd of them always at my heels. The parents were delighted, and began to share the affection of their children. Nevertheless, the next time I sketched a dance, all this went for nothing.

"Much discouraged, at last I determined to try living with the Indians. Accordingly, I moved books, papers, and blankets to the governor's house. On the dirt floor in one corner, I spread the blankets, and to the rafters slung a hammock. When the old chief came in that evening and saw that I had made myself at home, he shrugged his shoulders.

"'How long will it be before you go back to Washington?' he attempted to ask.

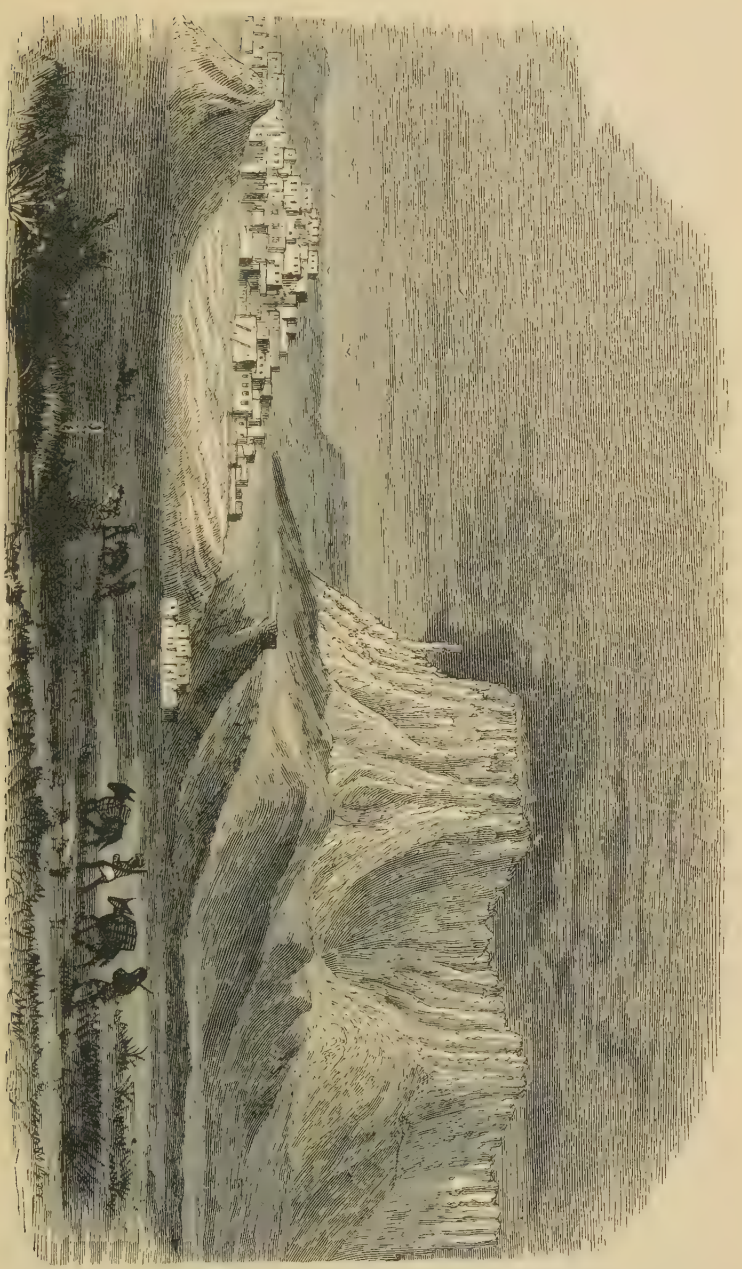
"'Two months,' I signified.

"'*Tuh!*' (damn) was his only exclamation, as he climbed to the roof and disappeared through the sky-hole."

Zuñi town is situated in the desert part of New Mexico, on an eminence from which a good view of the surrounding plain is had. It is reached by going southwest from Fort Mingate across a spur of the Zuñi Mountain, thence along the Rio Zuñi to Ojode Pescado. From the latter place it is a weary journey over scorching sands to Zuñi. The area of the town is about half a square mile, and streets are well laid out, running at right angles. The houses are built of adobe, one, two, three, and even six stories or terraces. Within a few years ground-doors have been cut in a few of the houses; but the usual mode of entrance is by ladder to the second story, thence inside by steps up and down. Some of the dwellings have isinglass windows, and a few have doors hung on hinges. On each floor there are several apartments.

Mr. Cushing describes his entrance into this queer town as follows: —

"I chanced to meet, over toward the river, an Indian. He was bareheaded, his hair banged even with his eyebrows in front, and done up in a neat knot behind, with long locks hanging down either side. He wore a red shirt and white cotton pantalets, slitted at the sides from the knees down so as to expose his bare legs, and raw-hide-soled moccasins. Strings of shell-beads around his neck, and a leather belt around his waist, into which were stuck a boomerang or two, completed his costume. Knitting-work in hand, he left his band of dirty white and black sheep and snuffling goats in charge of a wise-looking, grizzled-faced, bob-tailed mongrel cur, and came



ZUÑI.

with a sort of shuffling dog-trot toward the road, calling out, 'Hai! hai!' and extending his hand with a most good-natured smile.

"I shook the proffered hand warmly, and said, 'Zuñi?'

"'E!' exclaimed the Indian, as he reverentially breathed on my hand and from his own, and then, with a nod of his head and a fling of his chin toward the still distant, smoky terraces, made his exclamation more intelligible.

"I hastened on with all the speed I could scourge out of my obstinate, kicking mule, down the road to where the rivulet crossed it, and up again, nearer and nearer to the strange structures.

"Imagine numberless, long, box-shaped, adobe ranches, connected with one another in extended rows and squares, with others less and less numerous, piled up on them lengthwise and crosswise, in two, three, even six stories, each receding from the one below it like the steps of a broken stair-flight, — as it were, a gigantic pyramidal mud honey-comb with far outstretching base, — and you can gain a fair conception of the architecture of Zuñi.

"Everywhere this structure bristled with ladder-poles, chimneys, and rafters. The ladders were heavy and long, with carved slab cross-pieces at the tops, and leaned at all angles against the roofs. The chimneys looked more like huge bamboo-joints than anything else I can compare them with, for they were made of bottomless earthen pots, set one upon the other and cemented together with mud, so that they stood up, like many-lobed, oriental spires, from every roof-top. Wonderfully like the holes in an ant-hill seemed the little windows and doorways which everywhere pierced the walls of this gigantic habitation; and like ant-hills themselves seemed the curious little round-topped ovens, which stood here and there along these walls or on the terrace edges.

"All round the town could be seen irregular, large and small adobe or dried-mud fences, inclosing gardens in which melon, pumpkin, and squash vines, pepper-plants, and onions were most conspicuous. Forming an almost impregnable belt nearer the village were numerous stock corrals of bare cedar posts and sticks. In some of these, burros, or little gray, white-nosed, black-shouldered donkeys were kept; while many others, with front legs tied closely together, were nosing about over the refuse heaps. Bob-tailed curs of all sizes, a few swift-footed, worried-looking black hogs, some scrawny chickens, and many eagles, — the latter confined in wattled stick cages, diminutive corrals, in the corners and on the house-tops — made up the visible life about the place.

"Not an Indian was anywhere to be seen, save on the topmost terraces of this strange city. There hundreds of them were congregated, gazing so intently down into one of the plazas beyond, that

none of them observed my approach, until I had hastily dismounted, tied my mule to a corral post, climbed the refuse-strewn hill and two or three ladders leading up to the house-tops. The regular *thud, thud* of rattles and drums, the cadence of rude music which sounded more like the soughing of a storm-wind amid the forests of a mountain than the accompaniments of a dance, urged me forward, until I was suddenly confronted by forty or fifty of the men, who came rushing towards me with excited discussion and gesticulation. One of them approached and spoke something in Spanish, motioning me away; but I did not understand him, so I grasped his hand and breathed on it as I had seen the herder do. Lucky thought! The old man was pleased, smiled, breathed in turn on my hand, and then hastily addressed the others, who, after watching me with approving curiosity, gathered around to shake hands and exchange breaths, until I might have regarded myself the president, had not an uproar in the court attracted them all away; all, save one, a young, cadaverous-looking fellow with strange, monkey-like little eyes, who lingered behind and ventured: —

"'How-li-loo?'

"'Pretty well,' I replied. 'How are you?'

"'At's good,' said he; and this useful phrase he employed in every answer to my crowded queries, until I reluctantly concluded that it was the extent of his English."

The people were engaged in a "sacred dance" when Mr. Cushing and his party arrived. They lost no time in pitching their tent and going into camp. They had scarcely got settled when two or three Indians came into the tent and squatted on their haunches near the entrance. Mr. Cushing gave them cigarettes, which they smoked as if they enjoyed them. They were great talkers, and jolly. Later, the *gubernador*, Palowahtiwa, called. He was the chief or governor. Several sub-chiefs and the herald of the town came with him. A friendly interview was enjoyed, and the governor retired, professing high regard for "Americans."

Mr. Cushing describes Zuñi by saying: "Every schoolboy sketches a map of the Zuñi basin, when he attempts with uncertain stroke to draw on his slate a cart-wheel. The city itself represents the jagged hub, whence the radiating, wavering traits form the spokes, and the surrounding mesas and hills the rim. Let some crack across the slate and through the middle of the picture indicate the river, and your map is complete."

Unlike the nomadic tribes of the West, the Zuñis are a very

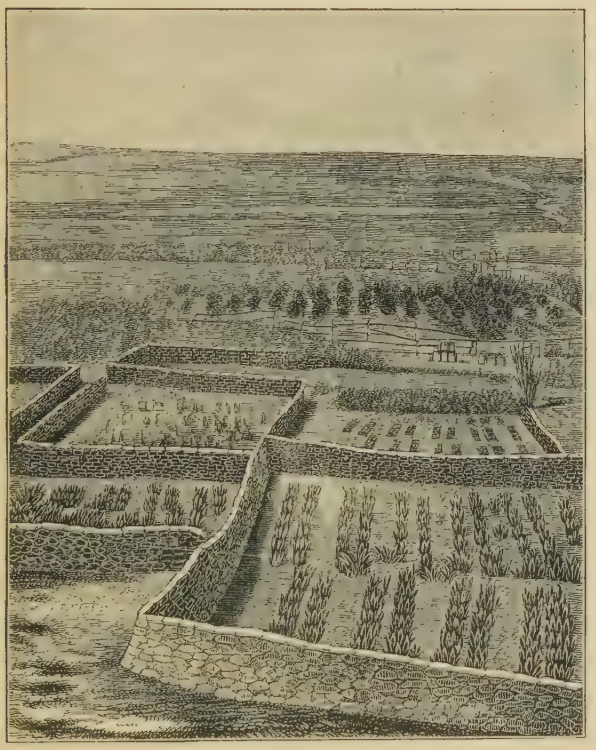
industrious people. They understand agriculture and pursue it, raising wheat, corn, and vegetables quite largely. Pumpkins, onions, and watermelons are their favorites. The donkey serves them for a beast of burden; and they raise cattle and sheep, weaving the wool of the latter into garments. Until recently they produced all the cloth that was worn by the tribe. Now, the visitor sees occasionally American goods, which traffic has brought to them. They understand the art of pottery, and produce jars and other vessels of attractive design. The goat is an important domestic animal among them, and fowl of all kinds are raised. The eagle is a sacred bird, and large numbers of them are seen about the town.

ZUÑI ALTARS AND INCANTATION SCENE.

Francis Pilett, who has visited the tribe, says: —

"Each dwelling is provided with a loom, which forms a conspicuous part of the furniture. It consists of two sticks, between which the threads, of the width of the blanket to be made, are spread, the whole arrangement being fastened to the floor and ceiling by rawhide strings. The operator squats on the ground, using for a shuttle a stick to which the wool for the cross-threads is fastened. The operation of weaving is skilfully performed, although a long time is required in the manufacture of one of their blankets."

The Zuñi altars are very sacred to them. If they do not take their shoes from their feet as they approach them, they do what is far more expressive of reverence and solemnity. The enclosure containing an altar is represented by a cut on the preceding page, and no one is allowed to enter it until the grave official conducting them takes a small quantity of white powder from a bag suspended from his neck, and, placing it upon a silver plate which hangs on his girdle, blows it into the air, accompanied with some strange mutterings of incantation, after which the visitor may enter. The meaning of this performance is simply this: it is an invocation to the spirit of Montezuma to return soon and fulfil his promise to bless and lead them. No one but the high-priest knows where the white powder comes from nor what it is.



ZUÑI VEGETABLE GARDEN.

Outside the town, though near by, is a large farm on which vegetables are raised. It is divided into patches, or gardens, one for each family, as represented by the cut; and here much labor is expended. The farm is watered by irrigation, which this people appear to understand, the Rio Zuñi furnishing the water.

The Zuñis hate the Mexicans, but respect Americans. The governor said to Mr. Pilett: "The Americans treat us well, but the Mexicans very badly; the latter have always maltreated us, and we want them neither to go through our country nor to reside among us. The heavens punish us by long drought for allowing them to remain in

the Colorado Chiquito. My *cacique*, who prays for rain, and who is the spiritual and imperial ruler of this people, watches the sun daily, and is much distressed because no rain falls. He attributes the drought to the presence of the Mexicans on our soil."

Mr. Pilett also relates the following: —

"The governor very cheerfully and politely accompanied us through the village. As the *cachina* dancers came in sight, and we halted to witness the ceremony, an elderly man approached and remonstrated with the governor for allowing us to look upon this form of worship. In reply to the remonstrance, Pedro Pino informed the

ZUÑI FARM-HOUSE.

intruder that he would allow us; 'but,' said he, 'no Mexican shall ever look upon the performance of this holy and sacred rite. The Americans,' he continued, 'have ever been our friends, and are good and excellent people. I have been in Washington, and have seen such men as Monroe and Calhoun, and have been in the halls of Congress. These men,' pointing to us, 'come from Washington, and I know they are good men.'"

The above is a good representation of a Zuñi farm-house, built of adope, of course, and well adapted to the purpose for which it is erected. Near it are the faithful donkeys, with their burdens, and a sample of the Zuñi cart. In summer, half of the tribe remove into

the country to cultivate their farms, the families dwelling apart from each other, or in small settlements.

Mr. Cushing discovered that there were thirteen orders or societies in the tribe, some of them strictly secret, and no white man had ever witnessed their ceremonial. But he succeeded in getting into them by dint of perseverance and strategy. He speaks of them as follows: —

"Functionally they are divisible into four classes: Those of War, of the Priesthood, of Medicine, and of the Chase; yet the elements of every one of these classes may be traced in each of all the others.

"Of the first class (Martial) there is but one society — the 'A-pi-thlan-shi-wa-ni,' or the 'Priests of the Bow,' at once the most powerful and the most perfectly organized of all native associations, in some respects resembling the Masonic order, being strictly secret or esoteric; it is possessed of twelve degrees, distinguished by distinctive badges.

"Of the second class (Ecclesiastical) there is also but one order — the 'Shi-wa-ni-kwe,' or society of priests, of the utmost sacred importance, yet less strictly secret than the first.

"Of the third class (Medical) are the 'Ka-shi-kwe' and 'A-tchi-a-kwe,' or cactus and knife orders — the martial and civil surgeons of the nation; the 'Ne-we-kwe' and 'Thle-we-kwe,' or the gourmands and stick-swallowers; 'Bearers of the Wand,' who treat diseases of the digestive system; the 'Ka-ka-thla-na-kwe' and 'Ma-ke-thla-na-kwe,' or grand ka-ka (dance) and grand fire orders, who treat inflammatory diseases; the 'Ma-ke-tsa-na-kwe' and 'Pe-sho-tsi-lo-kwe,' or the lesser fire and insect orders, who treat burns, ulcers, cancers, and parasitic complaints; the 'U-hu-hu-kwe,' or 'Ahem' (cough) order, who treat colds, etc.; and lastly, the 'Tchi-to-la-kwe,' or rattlesnake order, who treat the results of poisoning, actual or supposed, resulting from sorcery or venomous wounds.

"Of the fourth class (Hunters) there is again but one order — the 'San-ia-k'ia-kwe,' or 'Tus-ki-kwe,' blood or coyote order — the hunters of the nation.

"To all these a fourteenth organization might be added, were it not too general to be regarded as esoteric, notwithstanding its operations are strictly secret and sacred. I refer to the much quoted, misspelled, and otherwise abused 'Ka-ka,' 'the Dance,' which is wonderfully perfect in structure, and may be regarded as the national church, and, like the church with ourselves, is rather a sect than a society.

"Perhaps the Priesthood of the Bow is the only truly esoteric of all these bodies, since members of it may be admitted to meetings of all the others, while members of the other societies are strictly excluded from the meetings of this.

"Early learning this, I strove for nearly two years to gain membership in it, which would secure at once standing with the tribe and entrance to all sacred meetings, as well as eligibility to the Head Chieftaincies. We succeeded, and the memory of my experience in this connection is a deeply interesting chapter of my life."

Mr. Cushing was a Zuñi now so far as dress could make him. But there was other experience for him before he could be fully established in the confidence of the tribe. The Governor confided in him, and insisted upon calling him, "My little Brother." He demanded, also, that Mr. Cushing should call him "My old Brother." This additional experience he rehearsed thus: —

"One evening, the Governor beckoned me to follow, as he led the way into the mud-plastered little room, whither he had unearthed my head-band. In one corner stood a forge, over which a blanket had been spread. All trappings had been removed, and the floor had been freshly plastered. A little arched fireplace in the corner opposite the forge was aglow with piñon, which lighted even the smoky old rafters and the wattled willow ceiling. Two sheepskins and my few belongings, a jar of water, and a wooden poker were all the furnishings. 'There,' said he, 'now you have a little house, what more do you want? Here, take these two blankets, — they are all you can have. If you get cold, take off all your clothes and sleep next to the sheepskins, and *think* you are warm, as the Zuñi does. You must sleep in the cold and on a hard bed; that will harden your meat. And you must never go to Dust-eye's house [the Mission], or to Black-beard's [the trader's] to eat; for I want to make a Zuñi of you. How can I do that if you eat American food?' With this he left me for the night.

"I suffered immeasurably that night. The cold was intense, and the pain from my hard bed excruciating. Although next morning, with a mental reservation, I told the Governor I had passed a good night, yet I insisted on slinging my hammock lengthwise of the little room. To this the Governor's reply was: 'It would not be good for it to hang in a smoky room, so I have packed it away.' I resigned myself to my hard fate and harder bed, and suffered throughout long nights of many weeks rather than complain or show any unwillingness to have my 'meat hardened.'

"An old priest, whom I had seen at the head of one of the dances, and whose fine bearing and classic, genial face had impressed me, used to come and chat occasionally of an evening with the Governor, in the other room. Often, as he sat in the fire-light, his profile against the blazing background made me wonder if the ghost of Dante had not displaced the old Indian for a moment, so like the profile of the great poet was the one I looked upon. He had conceived a great affection for me, and his visits became more and more frequent, until at last one day he told me his name was Laí-iu-ah-tsai-lun-kia, but that I must forget his name whenever I spoke to him, and call him 'father.' Now that I wore the head-band and moccasins of his people, his attentions were redoubled, and he insisted constantly that I should dress entirely in the native costume, and have my ears pierced. That would make a complete Zuñi of me, for had I not eaten Zuñi food long enough to have starved four times, and was not my flesh, therefore, of the soil of Zuñi?'

"I strongly opposed his often repeated suggestions, and at last he so rarely made them that I thought he had altogether given up the idea.

"One day, however, the Governor's wife came through the doorway with a dark blue bundle of cloth, and a long, embroidered red belt. She threw the latter on the floor, and unrolled the former, which proved to be a strip of diagonal stuff about five feet long by a yard in width. Through the middle a hole was cut, and to the edges, either side of this hole, were stitched with brightly colored strips of fabric, a pair of sleeves. With a patronizing smile, the old woman said: —

"'Put this on. Your brother will make you a pair of breeches, and then you will be a handsome young man.'

"Under her instructions I stuck my head through the central hole, pushed my arms down into the little blanket sleeves, and gathered the ends around my waist, closely securing them with the embroidered belt. The sudden appearance of the Governor was the signal for the hasty removal of the garment. He folded it up and put it away under the blanket on the forge. Long before night he had completed a pair of short, thin, black cotton trousers, and secured a pair of long, knitted blue woollen leggins.

"'Take off that blue coat and rag necklace,' said he, referring to my blue flannel shirt and a tie of gray silk. 'What! *another* coat under that. Take it off.'

"I removed it.

"'There, now! Go over into that corner and put these breeches on. Don't wear anything under them.'

"Then the coarse woollen blanket shirt was again put on as before, only next to my skin. There were no seams in this remarkable garment, save where the sleeves were attached to the shoulders, and from the elbows down to the wrists. The sides, a little below the armpits, and the arms inside down to the elbow, were left entirely exposed. I asked the Governor if I could not wear the under-coat.

"'No,' said he. 'Didn't I say you must have your meat hardened?'

"Fortunately, however, a heavy gray serape, striped with blue and black, and fringed with red and blue, was added to this costume. One of the young men gave me a crude copper bracelet, and the old priest presented me with one or two strings of black stone beads for a necklace.

"The first time I appeared in the streets in full costume the Zuñis were delighted. Little children gathered around me; old women patronizingly bestowed compliments on me as their 'new son, the child of Wa-sin-to-na.' I found the impression was good, and permitted the old Governor to have his way. In fact, it would have been rather difficult to have done otherwise, for, on returning to my room, I found that every article of civilized clothing had disappeared from it."

But his ears were not yet pierced, for he steadily opposed it. Thinking, however, that there might be some meaning or significance in the operation which he might learn, he submitted. Boring the ear was attended with imposing ceremonials, closing with a long prayer, in which he was recommended to the gods as a "Child of the Sun." The Zuñis are not Catholics, but sun-worshippers. At the close of the ceremony, the Governor said: —

"And thus become thou my son, Te-na-tsa-li." His wife added: —

"This day thou art made my younger brother, Te-na-tsa-li."

Other members of the group came forward, repeating some part of the ceremonial, and closing with the repetition of his new name, "Te-na-tsa-li." Then the Governor led him to the window, and said: —

"You are named after a magical plant which grows on a single mountain in the west, the flowers of which are the most beautiful in the world, and of many colors; and the roots and juices of it are a panacea for all injuries to the flesh of man. By this name, which

only one man in a generation can bear, you will be known as long as the sun rises and sets, and smiles on the Corn people of earth, as a Shi-wi (Zuñi)."

The Zuñis are extremely hospitable. They have no beds to offer a visitor, but a plenty of nice blankets. They have few luxuries to set before a guest, but good bread and meat in abundance. Their furniture is scanty, but the visitor can always find a seat on the plastered floor. Their language is much like that of the Pueblos, a sort of monkey-chatter, but their gesticulations and facial contortions generally make its meaning plain. Their dress, too, is civilized, though homespun. Of this, Mr. Pilett says: —

"Their dress is simple, that of the men being merely cotton drawers and shirt, with blue woollen stockings of their own manufacture; a turban of wool or cotton completes the male attire. The females wear a gown of wool, held at the waist by a sash of the same material; the arms and shoulders are left bare; their stockings same as those worn by the men; for shoes, both males and females wear moccasins of buckskin. When in the street, the women cover the head and shoulders with a white cloth."

Mr. Cushing took advantage of his transformation into a Zuñi, to learn the secrets of the tribe, domestic, social, and religious. Of course he learned many curious things; and we shall close this account by quoting his description of one of the festivals he witnessed.

We turn aside, however, to give the opinion of a writer who speaks from personal knowledge of the antiquity of this people. "We are enabled to locate the Zuñi tribe as far back as 1456," he says, "and as their traditions point to a westward origin, we may, we think, safely conclude that the chain of ancient villages remarked by us between the Rio Verde and Camp Apache, Arizona, as well as the caves near the Verde — still strewn with fragments of pottery, some of which is identical with that still in use by the Zuñis — were occupied by this people centuries before the appearance of Columbus on the eastern coast; but whether this is an indigenous civilization, or of Toltec, Aztec, or Asiatic origin, it seems quite impossible, in the light of present knowledge, to determine. The theories concerning the genesis of the Aztecs and Toltecs are almost as numerous as the writers on that subject."

Also, their traditions, as far as Mr. Pilett was able to understand, he puts briefly thus: —

"The traditions of the Zuñi are few and simple. They say their

people came from the northwest on their march southward; that all Pueblo Indians belong to a common race, and are all members of the large families called Aztecs, or Montezumas; that some of their forefathers remained behind in the great migration of the nation, while the large body pursued a southerly course, ultimately forming the mighty empire of Mexico, as found by Cortez after its conquest; that, long before the white man came, their people inhabited the mesa south of their town. They have traditions, also, of a flood; of the founding of their present pueblo; of their war with the Spaniards, and their subjugation, by the latter, for a time; of the arrival of the first American in New Mexico, and of the Mexican and Navajo War. But their knowledge of these events is merely outline, they being unable to give any details."

All explorers agree that Zuñi life strikingly resembles ancient life in Palestine. The manners and customs, methods of doing work, implements of husbandry, women carrying jars of water upon their heads, and other things, are suggestive of style of life once lived in the Holy Land. Mr. Cushing says, "As I sat watching the women coming and going to and from the well, 'How strangely parallel,' I thought, 'have been the lines of development in this curious civilization of an American desert, with those of Eastern nations and deserts.' Clad in blanket dresses, mantles thrown gracefully over their heads, each with a curiously decorated jar in her hand, they came one after another down the crooked path. A little passage-way through the gardens, between two adobe walls to our right, led down rude steps into the well, which, dug deeply in the sands, had been walled up with rocks, like the pools of Palestine, and roofed over with reeds and dirt. Into this passage-way and down to the dark, covered spring they turned, or lingered outside to gossip with new-comers while awaiting their chances, meanwhile slyly watching, from under their black hair, the strange visitors from 'Wa-sin-to-na.' These water-carriers were a picturesque sight, as with stately step and fine carriage they followed one another up into the evening light, balancing their great shining water-jars on their heads."

To return from this digression to the festival which Mr. Cushing describes. Eighteen days before, the Governor said to him, "Little brother, make your heart glad; a great festival is now every one's thought. Eighteen days more, and from the west will come the Shá-la-k'o; it welcomes the return of the Kâ-kâ and speeds the departure of the Sun. Make your heart glad, for you shall see it too."

There was great opposition to his witnessing this festival; but the decision of the Governor, who had become strongly attached to his ward, settled the matter; whereupon he was instructed as follows:—

"'When you go in, little brother, you must breathe on your hand, and, as you step into the fire-light, you must say, "My fathers, how are you these many days?" They will reply, "Happy, happy!" You must not touch one of them, nor utter a single word in Spanish or American, nor whistle. But you must behave very gravely, for it is *ák-ta-ni* [fearful] in the presence of the gods. If you should happen to forget, and say a Spanish word, hold out your left hand and then your right, one foot and then the other, and they will strike them very hard with a wand of yucca.'

"The messenger guided me to the low door, which I entered, breathing audibly on my hand. Stepping into the brightly lighted centre of the room, I started off very well with, 'My fathers,' (*Hóm a tá-tchu*), but here broke down; and, placing the candles and tobacco on the floor, with a muttered apology, I unfortunately finished partly in Spanish. Instantly two or three of the sprawling priests started up exclaiming '*Shu! shu!*' and stretched their hands excitedly toward me. One of them took a wand from the front of the altar, and gravely advanced toward me. Without a word, I stretched out my hand, and he hit me a terrific blow directly across the wrist. Never wincing, however, although the pain was excruciating, I stretched out the other hand and my two feet in succession, receiving the hard blows on each. I breathed on my hand, and said, *É-lah-kwa* (thanks!). The priest spat on the wand, smiled, and waved it four or five times around my head. The white-haired father of the ten then approached me, placed his finger on his lips as a warning, thanked me for the presents, and asked that the 'light of the gods might shine on my path of life.' But he directed that I be hustled away, for fear I might commit some other indiscretion.

"I had gained my object, however, in merely entering the room. It was large. At the western end stood an altar, composed of tablets of various heights and widths, strangely carved and painted in representation of gods, and set up in the form of a square. At the back were larger tablets, on and through which figures of the sun, moon, and stars were painted and cut. Within the square stood a number of sacred wands of long macaw feathers inserted into beautiful wickerwork handles. Overhead hung the figure of a winged god, a little in front of and below which was suspended horizontally an elaborate cross. It was composed of two tablets, carved to zigzag points at the

ends, and joined at the centre, so as to resemble a wind-mill with four arms. Numerous eagle plumes depended from the lower edges of the four arms, on each of which was perched the effigy of a swallow. Underneath this stood a large medicine-bowl with terraced edges. It was crowded with figures of frogs, tadpoles, and dragon-flies, and contained a clear, yellowish fluid. Over this two of the priests were crouching and muttering incantations. Behind the altar, partly covered with little embroidered cotton kilts, were the warty masks and the neck-cloths of these priestly clowns. Almost immediately on entering, my guide had uttered prayers and scattered medicine flour over them. All along the walls of the great room, now vivid in the firelight, now indistinct in the flickering shadows, were painted in red, green, blue, and yellow, the figures of animals, birds, human monsters, demons, and significant pictographs.

"This little glimpse revealed to me a mysterious life by which I had little dreamed I was surrounded, and I looked forward with curious anxiety to the coming ceremonials.

"That night, on my way home, I saw great fires blazing on the southwestern hills. I could hear the sound of rattles, and the long, weird cries of the dancers, whose forms were too distant to be seen even against the snow-sprinkled slopes. 'The Long-horn and the Hooter, the wand-bearers and the sacred guardians, whom you shall see four days hence,' said my brother, as he opened the door to let me in, and motioned with his head in the direction of the sounds.

"During the next day, hundreds of Navajos, Moquis, and Indians from the Rio Grande pueblos, gathered in from the surrounding country. Everybody was busy. Oxen were slaughtered by the dozen, sheep by the hundred. In every household some of the men could be seen sewing garments both for themselves and the women. The latter were busily engaged in grinding corn, cooking paper-bread over great polished, black stones, cutting up meat, bringing water, and weaving new blankets and belts. Outside, continual streams of burros, heavily laden with wood, came pouring in from the surrounding mesas.

"Toward evening, on the second day following, people began to gather all over the southern terraces, and away out over the plain there appeared seven gigantic, black-headed white forms, towering high above their crowd of attendants. Gradually they came toward the pueblo, stopping, however, midway in the plain across the river, to perform some curious ceremonials. Meanwhile, eight remarkably costumed figures preceded them, crossed the river, and passed along

the western end of the pueblo. These were the same the Governor had told me of. The 'Long-horn' and the 'Hooter' were clothed in embroidered white garments, and their faces were covered by horrible ghastly, white masks, with square, black eye and mouth-holes. Their head-dresses were distinguished from each other only by the large white appendages, like bat-ears, attached to one of them, while the other was furnished with a long green horn, from which depended a fringe of wavy black hair, tufts of which covered the heads of both. They bore in their right hands clattering rattles made from the shoulder-blades of deer, and in their left, painted plumed sticks. Following came two red-bodied, elaborately costumed and ornamented characters wearing round, green helmets, across the tops of which were attached painted round sticks with shell-rattles at either end. They bore in their hands white deer-horns and plumed sticks, and were, with the others, guarded by two nearly nude figures with round-topped, long-snouted red masks, surrounded at the neck by collars of crow-feathers. They carried rattles like those of the chief figures, and long yucca wands with which to chastise spectators who might approach too near.

"All of these were preceded by a gorgeously costumed, bare-headed priest, with streaks of black, shining paint across his eyes and chin, and profusely decorated with turquois ear-rings and shell necklaces. A snow-white deerskin mantle was thrown gracefully over his shoulders, and trailed in the dust behind. He carried a tray of sacred plumes in his hand, and was closely followed by a representation of the fire-god. This was an entirely nude boy, the body painted black and covered all over with many-colored round spots. His face and head were entirely concealed by a round-topped, equally black and speckled mask or helmet. Slung across his shoulder was a pouch made from the skin of a fawn, and in his hand a long, large smoking torch of cedar bark, which he kept gracefully waving from side to side.

"The whole party passed rapidly toward one of the plazas, where a square hole had been dug by the Priest of the Sun. After dancing back and forth four times to the clang of their rattles, uttering at intervals cries of hoo too! hoo too! the four principal characters, with long prayers and ceremonials, deposited sacrifices of some of the plumed sticks. This ceremonial was repeated in the chief plazas of the pueblo, and outside of it north, south, and east, after which the whole party, just at sunset, retired into one of the immense sacred rooms at the southern side of the town.

"After dusk, the giant figures which had been left on the plain across the river came in one by one. They were, by all odds, the most monstrous conceptions I had seen among the Zuñi dances. They were at least twelve feet high. Their gigantic heads were shocks of long black hair with great horns at the sides, green masks with huge, protruding eye-balls, and long, pointed, square-ended, wooden beaks; and their bodies were draped with embroidered and tasselled blankets, underneath which only the tiny, bare, painted feet of the actor could be seen. The spasmodic rolling of the great eye-balls and the sharp snapping of the beak as it rapidly opened and closed, together with a fan-shaped arrangement of eagle-feathers at the back of the head, gave these figures the appearance of angry monster-birds.

"To each new house of the pueblo one of these monsters was guided by two priests. The latter were clad in closely fitting buck-skin armor and round, helmet-like skull-caps of the same material. Several elaborately costumed flute-players, together with a Kó-yi-ma-shi or two, attended. After prayers and ceremonials before the ladders of the houses to be entered, each, with his two attendant priests, mounted with great difficulty, descended through the sky-hole, and was stationed at one end of the room, near the side of an altar, differing only in details from the one already described as belonging to the Kó-yi-ma-shis. Immense fires of sputtering piñon-wood, and rude, bowl-shaped lamps of grease, brilliantly lighted up each one of these closely curtained rooms.

"Toward midnight, my brother explained to me that, in each new room and sacred house of Zuñi, the twelve 'medicine' orders of the tribe were to meet, and that, as he was a priest of one of them, I could go with him, if I would sit very quiet in one corner, and not move, sleep, nor speak during the entire night.

"As we entered the closely crowded, spacious room into which the first party of dancers had retired, a space was being cleared lengthwise through the centre, from the altar down toward the opposite end. With many a hasty admonition, the Governor placed me in a corner so near the hearth that, for a long time, controlled by his directions, I was nearly suffocated by the heat. Along the northern side of the room were the dancers, their masks now laid aside. Conspicuous among them were the two priests, who were engaged in a long, rhythmical prayer, chant, or ritual, over eight or ten nearly prostrate Indians who squatted on the floor at their feet. As soon as this prayer was ended, great steaming bowls of meat, trays of

paper-bread, and baskets of melons were placed in rows along the cleared space. A loud prayer was uttered over them by an old priest, who held in his hands a bow, some arrows, and a war-club, and who wore over one shoulder a strange badge of buckskin ornamented with sea-shells and flint arrow-heads. He was followed by the Priest of the Sun, from the other end of the room. The little fire-god then passed along the array of victuals, waving his torch over them, with which the feast was pronounced ready.

"Many of the dishes were placed before the dancers and priests and a group of singers whose nearly nude bodies were grotesquely painted with streaks and daubs of white. They were gathered, rattles in hand, around an immense earthen kettle-drum at the left side of the altar, opposite the now crouching monster. As soon as the feast was concluded, many of the women bore away on their heads, in huge bowls, such of the food as remained.

"The singers then drawing closely around the drum, facing one another, struck up a loud chant, which, accompanied by the drumming and the rattles, filled the whole apartment with a reverberating din, to me almost unendurable. Two by two the dancers would rise, step rapidly and high from one foot to the other, until, covered with perspiration and almost exhausted, they were relieved by others. At the close of each verse in the endless chant, the great figure by the altar would start up from its half-sitting posture, until its head nearly touched the ceiling, and, with a startling series of reports, would clap its long beak and roll its protruding eyes in time to the music.

"When the little fire-god took his place in the centre of the room, no one relieved him for more than an hour and a half, and I feared momentarily that he would drop from sheer exhaustion. But I learned later that this was a trial ceremonial, and that it was one of the series of preparations which he had to pass through before becoming a priest, to which rank his birth rendered him eligible.

"Just as the morning star was rising, the music ceased, the congregation became silent, and the chief dancer was led to the centre of the room, where he was elaborately costumed. Then the Priest of the Sun took him up the ladder to the roof, where, facing the east, he pronounced in measured, solemn tones a long prayer to the waning Sun of the Old Year. Descending, he pronounced before the multitude (signalizing the end of each sentence with a clang of his rattles) a metrical ritual of even greater length. Then the spectators gathered around the altar, and hastily said their prayers, the sound

of which reminded me of a recitation in concert in a large school-room. The sun rose, and they dispersed to their various homes.

"Some time after, the dancers, one by one, still in costume, passed over the river toward the southward; and the monsters, to the sounds of chants, accompanied by rude music on the flutes, were guided across to a flat, snow-covered plain, where, in the presence of the assembled priests of Zuñi, — but no others, — they ran back and forth, one after another, over a great square, planted plumed sticks at either end of it, and, forming a procession, slowly marched away and vanished among the southern hills. Toward evening no fewer than seven curious dance-lines of the ka-ka at one time occupied the principal court. Most of that, as well as of the three succeeding nights, were passed in ceremonials at the sacred houses and *estufas*. With this the great festival was over. The assembled Indian visitors, laden with food and the products of Zuñi looms, departed for their various tribal homes."

The Zuñis and Moquis cannot understand each other. Yet, in their general appearance, they are alike. A description of the domestic and social life of one tribe would be essentially a description of the other. The following account of the Moquis is equally correct of the Zuñis: —

"The women looked neat and contented, seeming to be always busy, some weaving their thick woollen dresses, others grinding grain or baking their curious wafer-like bread, accompanying the labor with strange, weird songs. The grinding is done by three women, who kneel over stone troughs sunken into the floor. Slabs of stone of different degrees of roughness are placed like a wash-board in the troughs, and on these the grinding is done by rubbing the grain with another stone of the size and shape of a small rolling-pin. The first reduces the grain, which has been already cracked, to meal, the next makes it finer, and the third turns it out a fine flour. It thus passes from one trough to another, occupying nearly an hour in the process. The women, mostly young, and some of them quite pretty, work with a coquettish merriment, keeping perfect time with their music, throwing their bodies forward together, so as to bring nearly their whole weight upon the mill. Their long, glossy hair, which is kept very clean, is tossed freely about their necks, adding much to their grace and beauty.

"One room of each house is devoted to grinding and baking, the latter process being even more curious than the former. A smooth slab of slate two feet square is fixed in the large fireplace and heated

by coals. The hand is dipped into a thin dough of the consistency of cream, and then rubbed quickly over the stone, this being repeated four or five times, till a cake is formed covering the entire stone, yet no thicker than tissue-paper. Only a few seconds are occupied in the baking, when the bread is taken off, and the operation repeated, till a few quarts of dough are manufactured into perhaps a thousand tortillas, one of which would hardly make a mouthful, but the thousand would cover the floors of five large rooms. These sheets are made into rolls, a dozen or more being rolled together, and are then eaten literally by the yard."

Mr. Cozzens paid this singular people a visit, and enjoyed their hospitality. We condense the substance of what he says about them as follows: —

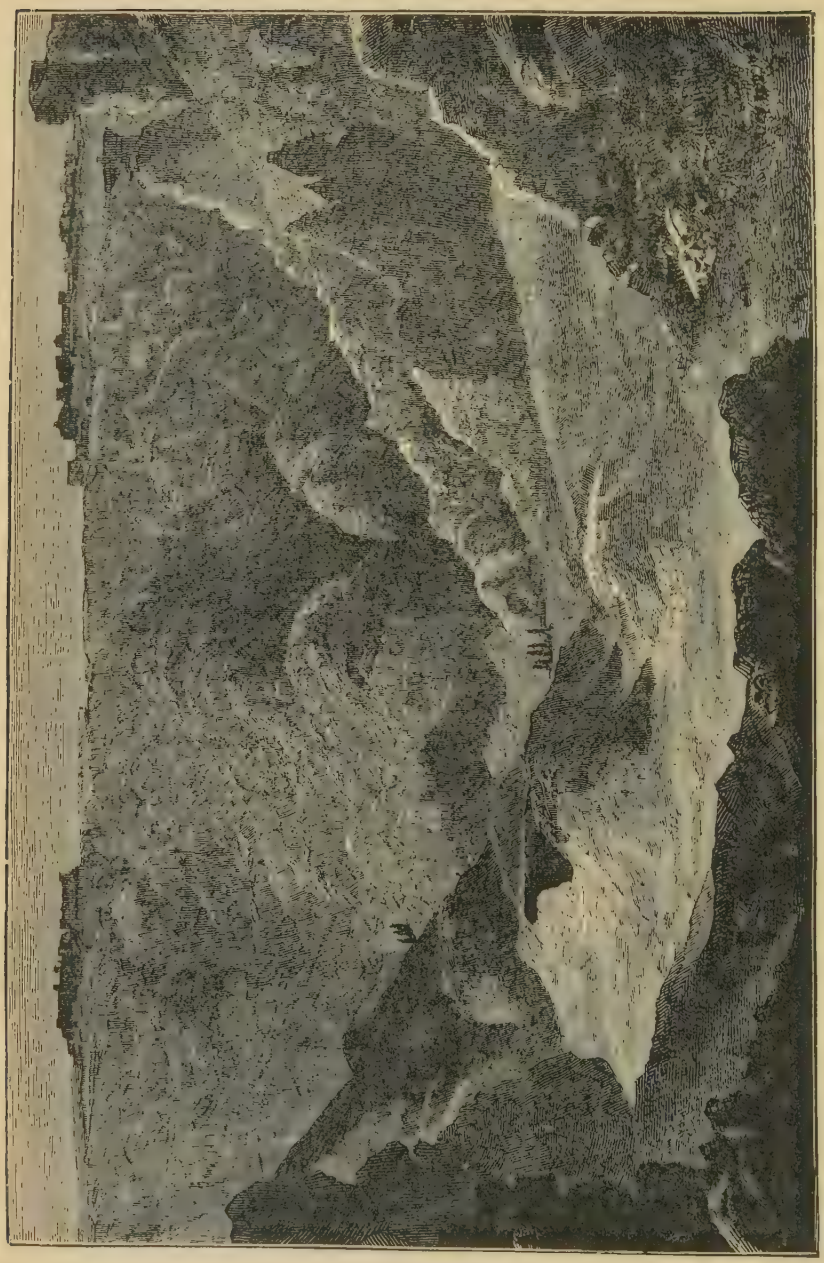
"Their villages, of which there are seven, are built upon the very edge of these rocky mesas, in so singular a manner that, at a little distance, it is impossible for a stranger to distinguish them from the rocks, of which they appear to form a part. The first three of these are built upon a bluff of solid rock, about three hundred feet high, and one hundred and fifty feet in width, and are reached by steep paths and by steps cut into the rock in such a manner that they can only be approached by persons on foot.

"The houses are built of stone, are generally two stories high, and are laid in a mortar made of mud, which is brought from the valleys below upon the backs of men, there being no soil whatever upon the rocks. In form they are similar to those of Zuñi, entrance to them being by ladders, as there are neither doors nor windows in the lower stories.

"The first and largest town is called Harro; and contains a population of about two thousand persons. . . . The population of all the villages is supposed to be about six thousand.

"Of their religious belief: They believe in a Great Father, who dwelt where the sun rises, and of a Great Mother, who lived where the sun sets. She peopled the earth by bringing from her own home nine things, from which sprang the different races of men. First, the deer race; second, the sand race; third, the water race; fourth, the bear race; fifth, the hare race; sixth, the prairie-wolf race; seventh, the rattlesnake race; eighth, the tobacco-plant race; and ninth, the seed-grass race. That after death, they assumed the form from which they originally sprang, thus aiding to form anew the decaying elements of the earth.

"They never plough or irrigate their lands, depending entirely



THE MOQUIS PUEBLOS.

upon the natural fall of rain; their only agricultural implement is a kind of hoe; with this they plant corn, beans, onions, melons, pumpkins, cotton, and a species of tobacco-plant, in the valleys around

them. They also knit, weave, and spin very nicely, as do the Zuñis and the others of the Pueblo tribes.

"One very singular fact is, that, while the whole seven villages are within a radius of six miles, the people of Harro speak a different language from those of the remaining six villages, and seem to have preserved their manners and customs intact, as well as their language, for centuries; and another singular fact is, that, while the people of Harro understand and can converse in the language spoken by the people of the other villages, the latter neither understand nor can converse in the language spoken by the people of Harro. . . .

"I was surprised, upon offering them some whiskey, to have them decline it; also, to learn that the vice of drunkenness was unknown among them, and that they used no kind of fermented liquors, notwithstanding Neal Dow and the Prohibitory Law were strangers to them. I also learned that the crime of murder was unknown in their nation, that they never made war, but were brave and valiant when attacked.

"Their dress was similar to that of the Pueblo Indians, and in general appearance they strongly resembled them; although I fancied them more intelligent looking, their faces having a frank and manly expression; in fact, save in dress and complexion, they resembled American rather than Indian nationality.

"Their women are very pretty as well as industrious, and have a manner of dressing their hair which, to the initiated, proclaims their condition in life. If unmarried, they do it up in two inverse rolls, which give to the head a very singular appearance, not unlike that of having horns; after marriage, it is worn in two large braids on each side of the face. . . .

"Each house has its patron saint, represented by an ugly little Aztec image, made of wood or clay, gaudily painted and gorgeously decorated with feathers. These images are suspended by a string from the rafters of their houses, and are supposed to exert a great influence for weal or woe over its inmates.

"Every village has an *estufa* underground, or, more properly, a council-chamber, which is used as a public room; here the people are wont to congregate, to sit and smoke and talk over the affairs of the nation. The only light or air is obtained from a scuttle in the roof, which also serves as a door.

"From all I could learn of the Moquis, I concluded that they were a simple, moral, industrious, and hospitable people, and without doubt are legitimate descendants of the Aztec race."

MEXICANS.

The blood of the Spaniard and nomadic Indian mixed produced the Mexican. From personal observation we say that he has much in common with the people already described. In his habits and customs, superstitions, methods of labor, occupation, implements of husbandry, and decided opposition to progress, he resembles the Pueblos and their coadjutors.

The house which the typical Mexican occupies is built of sun-dried brick (adobe), usually eighteen inches long, nine wide, and four thick, as the house of his early ancestor was, over three hundred years ago. Short straw is mixed with the clay of which these bricks are made, in order to hold them together. They are laid with mortar made of the same material. When the height for the roof is reached,

On Line of D. & R. G. Railway. LIFE IN NEW MEXICO.

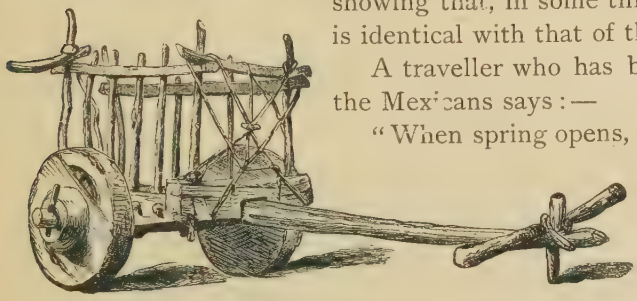
straight poles are laid close together, with a slight incline from one wall to its parallel wall. A coating of stiff mud is spread over these poles, and over that loose earth. The mud floor is levelled and smoothed, a fireplace constructed of adobe in one corner, a small door made and one or more windows; and this is a Mexican dwelling. Within a few years, since the railroad, telegraph, and telephone, and other improvements of modern civilization, have been thrust upon them, the more intelligent and enterprising class are imitating Americans somewhat in the construction of their houses. But the typical Mexican loves the old architecture of his forefathers still.

He clings, also, to the ancient mode of dress. Fashions never change with him. From time immemorial the Mexican dress has been substantially the same.

Mexicans have adopted few modern improvements to facilitate work. Machines that are prevalent in the New West, among Ameri-

cans, in farming and the mechanic arts, are not used by them. We saw Mexicans reaping grain with a knife that resembled the sickle of Palestine, the same as that used by their forefathers. Their plough is especially ancient, — the crooked stick of the Orient. Their method of grinding is similar. The burro, or donkey, is the Mexican's favorite beast of burden.

The following illustrations will enforce the foregoing remarks by showing that, in some things, Mexican life is identical with that of the Pueblos.



MEXICAN CART.

A traveller who has been much among the Mexicans says: —

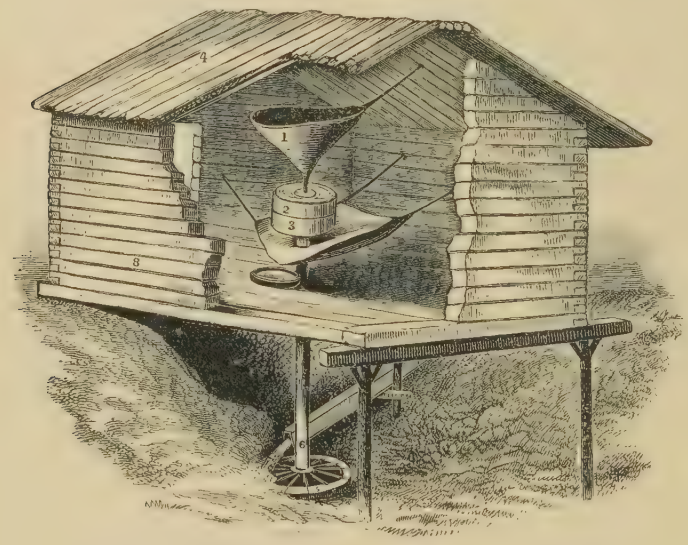
"When spring opens, the average Mexican farmer rouses from his day-dreams that he has been enjoying, wrapped in his blanket, while sitting in the sun on the warm side of the house. He calls in the neighbors, and ploughing begins. He gets the neighbors to assist him for two reasons. First, because he is decidedly a gregarious animal; he loves to work in a crowd. Besides this, in this ploughing business there is economy in running a number of teams at once, for the education of the Mexican ox is peculiar. For when that wooden pole with the block on the end, by courtesy called a plough, is fastened to his yoke, he expects one able-bodied man to walk in front, while another holds the single handle of the plow. But if another yoke of cattle is behind, they will follow the first plough, and so the more the merrier, and the work goes bravely on. The land is ploughed full two inches deep; the corn is planted and is ready for the water from the irrigating ditches."

MEXICAN PLOUGH.

No miller is required to run the following mill. It can grind but three bushels of corn in a day. Mexicans would not have it grind any more, if it could; for it ground no more than that in a day for their ancestors. The farmer takes his grist to the mill, where he finds the raw-hide hopper waiting to receive it. Into this hopper he

pours his grist, which slowly trickles down between the native mill-stones — slowness being one of the marvels of Pueblo and Mexican work. One of these stones is fastened to the top of an upright wooden shaft, while the lower end has projecting boards which serve as floats to catch the force of the stream which flows against it.

The cut on p. 213 represents the adobe fireplace, of which we have spoken, large, and in keeping with its Mexican surroundings. The traveller already quoted says : "The interior of the Mexican house, where I made my corn purchase, was so similar to others that a description is in order. The walls are built of adobe, and washed outside and inside with plaster of Paris, with a border near the floor, of yellow mica,



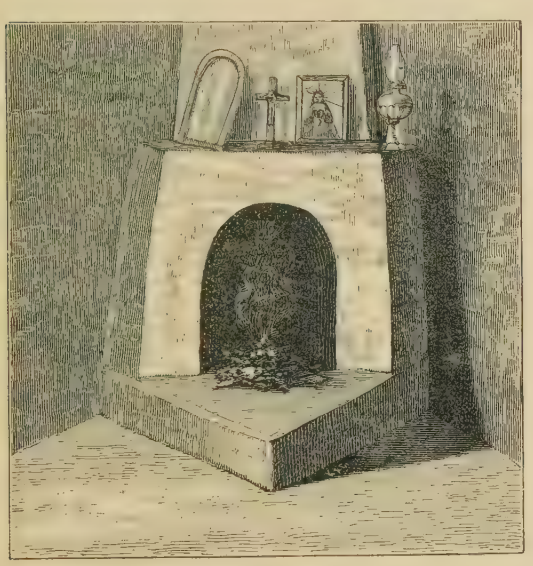
MEXICAN FLOUR-MILL.

which gives a fine effect. The floor is of the same composition as the walls, while the roof is of poles covered with earth. The windows are very small, and in many cases the rude sash is covered with cloth. The fireplace is very shallow and high, pointed and proportioned like a Gothic window ; burns the wood on end ; gives out a great light and heat ; is kept scrupulously clean, and is every way a success. A bedstead stood in the corner, but I found out afterward that bedsteads were never used except to hold the bedding through the day. At night everything comes down on to the floor, and is spread there."

The same writer describes the Mexicans as follows: —

"The male specimen, if he is poor, wears a blanket of home manufacture for a coat; a cheap hat, buckskin pantaloons, and moccasins complete his dress.

"He was born a Catholic, but if you ask him for a reason for the faith that is within him, he replies with the 'Quien Sabe,' or who knows, which he uses in all cases when he is ignorant or in doubt; and one or the other of these conditions covers most of his life. If he can talk a little English, look out for him. If he cannot, he will treat you well and divide his last morsel of food with you, if necessary.



ADOBE FIREPLACE.

"He is not very fond of work, but when it is absolutely necessary to buy candles and pay the musicians for a dance, or buy whiskey, you can rely on him for working as long as the necessity lasts.

"He does not talk good Spanish; it is so mixed with the language of the Utes or Navajo, from which he is partially descended.

"His richer neighbor, who owns the cattle in the vicinity, most likely can talk better, and write and read a little, although schools are so uncommon with them that all my attempts to give them any information in regard to Spain, or any country in Europe, were failures. For when they found that such places were across the sea, their minds refused to grasp more, and they would tell me that that was enough.

"A Mexican happened into a telegraph office. Its mysteries haunted him, until we met one evening, and he asked me to explain them. I rashly thought it could be done, and commenced a description of the way in which magnetism was developed by the acids and plates of the batteries. But he had never seen any sulphuric acid, zinc plates, or magnet, and knew nothing of their accomplishments. A young man with a group of friends came to the house at which I

was stopping, and handing me his hat, asked me to tell the company what was written on it. I happened to know his name, and saw that the strange characters were intended for it, and without any hesitation told the audience that that was his name. This was a triumph for him, as he had brought his friends several miles to prove by me that he could write. No one of them could tell, as they could neither read nor write themselves. After this happy disposal of the case, it occurred to him of the hat to arrange some business between us so that I should pay a friend of his some money, in case he completed a trade with him, which he expected to. 'But how am I to know,' I asked, 'whether you trade or not? Will you send an order by him for the money?' This was too much. He could write his name, but an order for money was too vast a thing. But he got out of the dilemma by telling me that his friend should wear his hat with his name on it, if the money was to be paid to him.

"A Mexican woman, with hardly an exception, has black eyes, and wears a long shawl over her head, with the ends brought around in front of the face, in such a manner as to leave only the eyes visible. With this arrangement, the effect is very fine. A swarthy skin or ugly feature is hidden, while the glorious eyes sparkle at you in their beauty from among the folds of the shawl.

"She exists under difficulties. In cooking she is restricted, by circumstances, to such dishes as can be prepared at a fireplace, with a small kettle and a flat rock or a piece of sheet iron, on which to bake cakes. Pies and puddings are unknown, except on great occasions. Besides the scarcity of cooking-utensils, a very small supply of food curbs any ambitious attempt to excel in cooking. Indeed, so insignificant is the whole stock of housekeeping utensils, that family divisions occur with alarming frequency. In that case account of stock is soon taken, a sheepskin or two and an old kettle being each one's share.

"When it comes to dress, the poorest ones even are equal to the emergency; for when the presence of the musicians on the street announces the approach of a dance, every woman in town is busy with a judicious system of temporary swaps of clothing, the result of which is a triumphant display, at the dance, of a combination of dress entirely new to the wearer. And woman's taste for an appearance in a costume never seen before, is gratified without the expense of shopping."

Mexicans are as fond of "The Dance" as the Zuñis are. Some of their dances are only social, others are connected with religious

ceremonies. But even social dances are a serious matter with them. They never laugh at a dance, not even at a mistake. The oldest people among them dance, as well as the youngest. At three or four years of age Mexican children begin to dance. These facts show that Mexicans resemble the ancient races discussed in respect to this amusement, whether social or sacred.

In courtship and marriage ceremony, there is much to remind one of the Zuñis. Also, funeral ceremonies, though differing considerably, nevertheless have striking points of resemblance. The traveller quoted went to a funeral, and he writes: —

"'Do you care to go to a valoria?' a friend said one evening. 'What is that?' I asked. 'Put a candle in your pocket and come and see,' was the reply. With the candle pocketed, I followed my companion up the hill to an humble dwelling at the top. As we entered, we found the four sides of the room occupied by persons busy in recounting the virtues of their deceased friend, who lay upon the earth floor, surrounded by burning candles, which had been contributed by the persons entering the house. I added mine to the number, and watched the proceedings awhile; but as they were very monotonous I adjourned.

"The next day the funeral took place, without any unusual ceremony, except the piling of stones whenever the coffin-bearers rested on the way to the grave.

"These stone piles are to be seen all over New Mexico, in the vicinity of church-yards."

The presence of dogs and donkeys, in large numbers, in a Mexican town, reminds one of a Pueblo town. A Mexican family has not a complete outfit without them.

There is another feature of Mexican life, which strikingly resembles some of the religious ceremonies of the Zuñis. The participators are "Penitenties"; and the authority cited describes the occasion very briefly: —

"Near every large town may be seen a long adobe building, generally closed, while inside are large wooden crosses, made from the unhewn timber of the vicinity. They are of different sizes and weights, generally from twelve to fifteen feet in length, and six or seven inches in diameter, and making a good load for the men who are to carry them.

"Various secret midnight meetings are held during the year. No one is supposed to know who the members of these societies are, and

no public demonstration is made by the whole society until their anniversary day in the spring.

"On this occasion the different penitenties assemble near the building, form a procession, and carry the crosses through the neighboring valley. As they walk, with their faces covered with a mask and their backs uncovered, the bystanders beat them with cactus bushes until the blood streams down their bodies.

"Sometimes they resort to other modes of torture, the idea seeming to be to add as much as possible to their burdens. I have known three persons to die from the effects of this self-inflicted torture, at one meeting; and this, too, only from one small neighborhood. Individual members of the society torture themselves at other times during the year, in various ways, such as lying down in front of the churches and begging the people, as they come out, to step on them, 'for the love of God.' This they do to help the matter along."

It is quite evident that while there may be a coloring of some forms of the Christian religion in these ceremonies, on the whole, it is a modified form of heathenism as it appears in other parts of the world to-day. The author from whom we quote appears to take that view, for he adds: —

"The car of Juggernaut has long ceased to crush its victims; but here in a territory of the United States is an annual offering of lives to heathenism."

Mexicans employ themselves, on the whole, very much as the races described do. They till the earth, raise cattle and sheep, and manufacture pottery, cloth, and blankets. The women do their housework, and also wash the wheat for the mill, and sift the bran from the flour on its return. As all families do not depend on the mill, women often "grind the grain by rubbing it between a large stationary stone and a long slim one, which they hold in both hands, grinding the grain as it slides down the face of the large one, on to the flesh side of a sheepskin spread out to receive it." The women, also, plaster the houses with mud, and whitewash them with plaster of Paris.

The writer already quoted sheds additional light upon the ways of this people by a graphic sketch of their "Every-day Life," which we furnish: —

"The furniture of a Mexican house is very simple; so, too, is their way of living.

"If you approach a house and wish for a meal or lodging, you wil

be welcomed, and invited to enter in the most polite manner. 'Pass in'; 'enter, gentlemen,' is the English of the most common imitation.

"If you are a relative or a particular friend of the family, the next thing on the programme is a species of hug, — not a good square hug as if you enjoyed it, but a rather formal affair, the hands of the parties being on each others shoulders. This thing is soon over with, and then comes a smoke all around.

"The finer corn husks make the wrapping for the cigarette. These are always carried conveniently and are passed around, filled with fine tobacco, folded and lit, and soon the air is blue with smoke and vocal with the gossip which is being exchanged.

"Perhaps some one has been elected to some church office, and is going to give a dance in honor of the event, and the particulars of that are under discussion.

"If you propose to stop to a meal and all night, and are an American, you will soon find that you have created quite an excitement. It rarely happens that one family of the poorer classes have all the requisites on hand for a good meal; so one child is despatched one way to borrow some article, another in a different direction for something else, while the woman of the house curls down by the fireplace to get the supper.

"There is a kind of cake they make of flour and water, without shortening or yeast of any kind. These they work out as thin with their hands as it is possible to make them, and then fry them floating in lard. They are brittle and are very good.

"As I was asked one evening what I would like for supper, I thought of these cakes, and said I would like some of them.

"Every one commenced laughing.

"I was astonished, for they rarely laugh at mistakes. I asked them if they hadn't plenty of flour.

"'Yes! But where shall we catch them?'

"After having plenty of fun at my mistake, they explained that by using a slightly different word, I had inquired for fried ghosts for supper.

"I never saw a woman sit at a table but once, and then it was in response to a remark that I made, that American women always sit at the table.

"'Yes,' said my host, 'that's so. Come here,' said he to his wife and daughter; and without any more delay he had them sitting at the table with us. They were not used to it, but went through it

very creditably, although I know they had much rather be eating at the fireplace as usual.

"On one occasion I was camping near a house of considerable size. The large herd of sheep belonging to the owner told of wealth; and when I accepted his invitation to dinner, I was surprised at his asking the loan of a knife and fork from my mess chest. But when we sat down to dinner, I was more surprised, for the table was covered with a new piece of Brussels carpeting.

MEXICAN POTTERY.

My knife and fork reposing in solitary state on the carpeted top of the table, while mine host evidently intended to ladle his dinner with a broken-handled spoon, which nestled close to the tin plate next to him.

"While the women in the kitchen were dishing up the red pepper, he asked me to name the price I thought he had paid for the carpet, adding, 'I have fifty yards in the corner.'

"I made the nearest guess I could, when he told me the cost, and said he wanted to put it down that afternoon.

"'What,' I asked, 'on the dirt floor?'

"'Why not?' he replied.

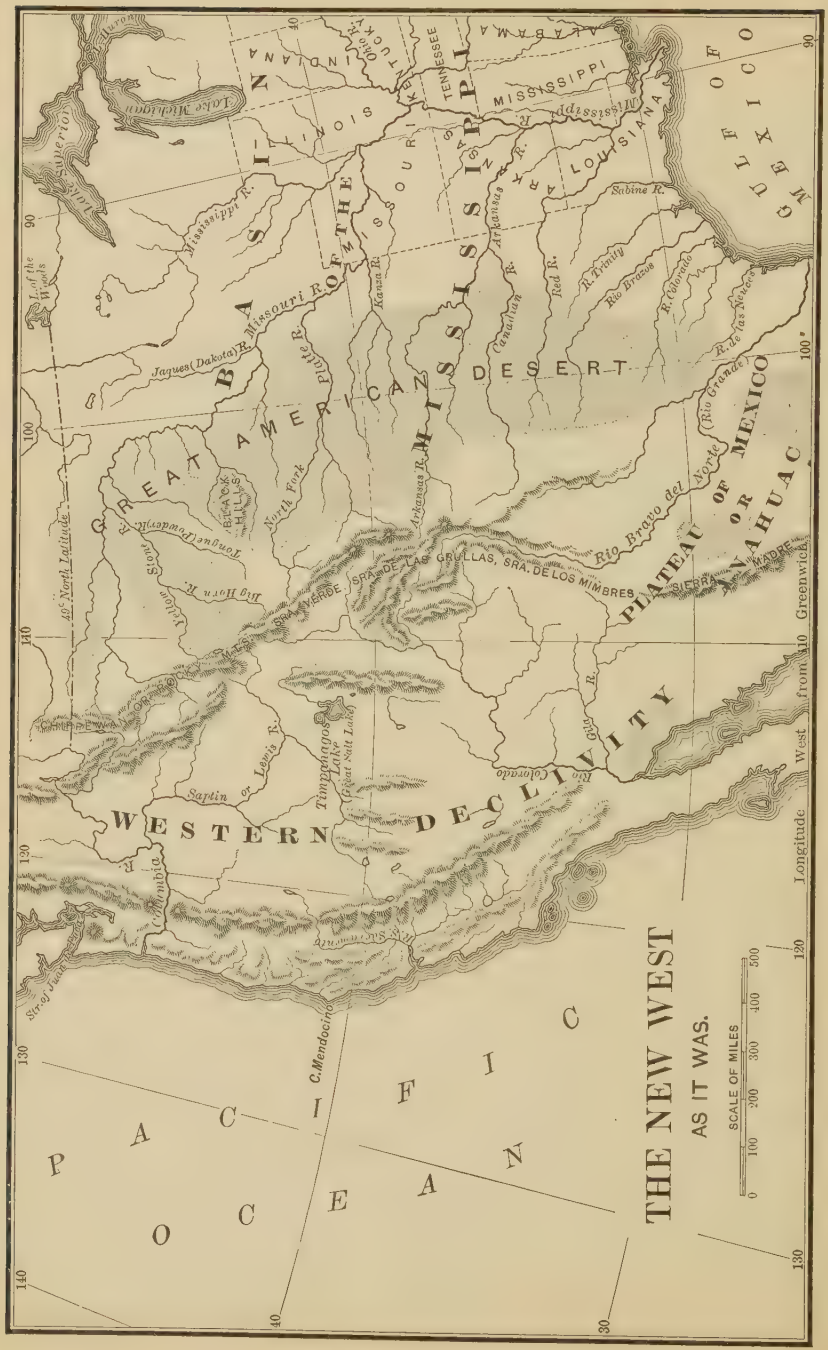
"Then followed a long discussion on the necessity of a board floor,

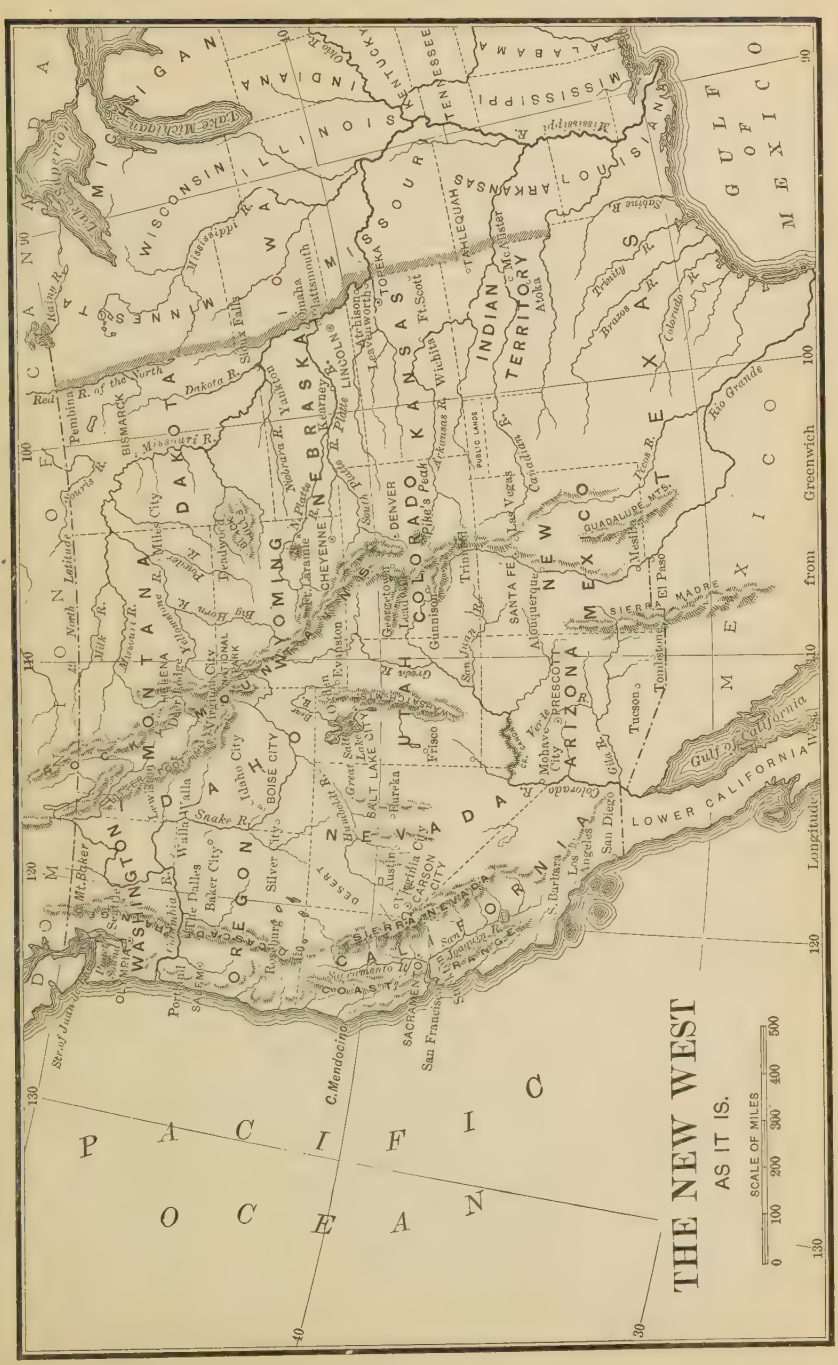
a thing unknown to him; and, with a long face, he finally resigned himself to the inevitable expense that was to come.

"The contemplation of a house with one hundred dollars' worth of carpet in one room, and not a knife or fork in the whole house, was so comical that I was constantly thinking of it; and that evening, at my stopping-place a few miles down the valley, I told my host the story, forgetting, when I commenced, that I was talking to another Mexican, who would quite likely take offence at my reflection on his race. He joined in the laugh, however, but looked awkward enough at the table that evening, where one could see but little improvement in his stock of knives and forks over that of his neighbor."

The likeness of Mexicans to the ancient races considered, is seen also in their knowledge of pottery. They understand the art well. There is a striking resemblance, too, in their methods of manufacture and styles of pottery produced. The illustration exhibits that similarity in a marked degree.

The foregoing facts confirm the statement with which we began, — that the Mexican is related to the ancient races described. The points of difference are few, in comparison with the points of resemblance. He belongs to our marvels of race.


THE NEW WEST
AS IT WAS.
SCALE OF MILES
0 100 200 300 400 500
BASIN OF THE MISSISSIPPI
GREAT AMERICAN DESERT
WESTERN DECLIVITY
PLATEAU OF MEXICO
ANAHUAC
PACIFIC OCEAN
GULF OF MEXICO
Lake Superior
Lake Michigan
Mississippi R.
Missouri R.
Jaques (Dakota) R.
Platte R.
Kansas R.
Arkansas R.
Canadian R.
Red R.
R. Trinity
Rio Brazos
R. Colorado
R. Rio Nueces
Rio Grande
Sabine R.
Rio Bravo del Norte
SIERRA MADRE
SRA. VERDE
SRA. DE LAS GRULLAS
SRA. DE LOS MIMBRES
Big Horn R.
Yellow Stone R.
North Fork
Timpanogos Lake
Great Salt Lake
Gila R.
Colorado
Saptin or Lewis R.
C. Mendocino
Str. of Juan de Fuca
Longitude West from 10 Greenwich
49° North Latitude


THE NEW WEST
AS IT IS.
SCALE OF MILES
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PACIFIC OCEAN
MEXICO
GULF OF MEXICO
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
COLORADO
UTAH
ARIZONA
NEW MEXICO
DAKOTA
NEBRASKA
KANSAS
INDIAN TERRITORY
TEXAS
LOUISIANA
ARKANSAS
MISSISSIPPI
ALABAMA
TENNESSEE
MISSOURI
ILLINOIS
WISCONSIN
MICHIGAN
MINNESOTA
IOWA
INDIANA
OHIO
KENTUCKY
Lake Michigan
Lake Superior
Mississippi R.
Missouri R.
Red R. of the North
Dakota R.
Yellowstone R.
Platte R.
Arkansas R.
Rio Grande
Colorado R.
Brazos R.
Trinity R.
Sabine R.
Pembina
BISMARCK
Fort Benton
Miles City
Deadwood
Black Hills
Yellowstone Nat. Park
Helena
Virginia City
Butte City
Salt Lake City
Great Salt Lake
Ogden
Evanston
Green River
Laramie
CHEYENNE
Fort Laramie
Omaha
Nebraska City
Plattsmouth
LINCOLN
Grand Island
North Platte
Kearney
Atchison
Leavenworth
TOPEKA
Ft. Scott
Wichita
DENVER
Pike's Peak
Arkansas R.
Public Lands
Trinidad
Las Vegas
Cimarron R.
Indian Territory
Atoka
Red River
Texas
Fort Worth
Dallas
Waco
Austin
Galveston
Houston
San Antonio
Brazos R.
Trinity R.
Colorado R.
Sabine R.
Shreveport
Vicksburg
Natchez
Jackson
Meridian
Mobile
Montgomery
Selma
Huntsville
Nashville
Memphis
Chattanooga
Knoxville
Cincinnati
Columbus
Toledo
Cleveland
Detroit
Lake Michigan
Lake Superior
Milwaukee
Madison
Chicago
Springfield
Peoria
Quincy
St. Louis
Kansas City
Jefferson City
Hannibal
Des Moines
Council Bluffs
Sioux City
Sioux Falls
Yankton
Dakota R.
Missouri R.
Niobrara R.
Platte R.
Republican R.
Kansas R.
Arkansas R.
Canadian R.
Red R.
Ohio R.
Mississippi R.
Tennessee R.
Cumberland R.
Alabama R.
Tombigbee R.
Pearl R.
Yazoo R.
Big Black R.
Wabash R.
Illinois R.
Rock R.
Des Moines R.
Iowa R.
Minnesota R.
Red River of the North
Lake of the Woods
Rainy R.
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Niagara R.
Lake Champlain
Lake George
Hudson R.
Albany
Troy
Schenectady
Utica
Syracuse
Rochester
Buffalo
Erie
Pittsburg
Harrisburg
Philadelphia
Trenton
New York
Boston
Portland
Augusta
Concord
Montpelier
Burlington
Providence
Hartford
New Haven
Albany
Troy
Schenectady
Utica
Syracuse
Rochester
Buffalo
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Pittsburg
Harrisburg
Philadelphia
Trenton
New York
Boston
Portland
Augusta
Concord
Montpelier
Burlington
Providence
Hartford
New Haven
Santa Fe
Albuquerque
Las Vegas
Taos
Pecos R.
Rio Grande
El Paso
Tucson
Prescott
Mohave City
Colorado R.
Gila R.
Yuma
San Diego
Los Angeles
San Bernardino
San Francisco
Sacramento
Stockton
Marysville
Virginia City
Carson City
Reno
Austin
Eureka
Ogden
Salt Lake City
Great Salt Lake
Provo
Fillmore
Beaver
Parowan
Cedar City
Kanab
Virgin R.
Colorado R.
Green River
Grand R.
Gunnison
Lake City
Del Norte
Pike's Peak
Arkansas R.
Platte R.
Cheyenne
Laramie
Fort Laramie
Evanston
Green River
Rock Springs
Salt Lake City
Ogden

III. MARVELS OF ENTERPRISE.

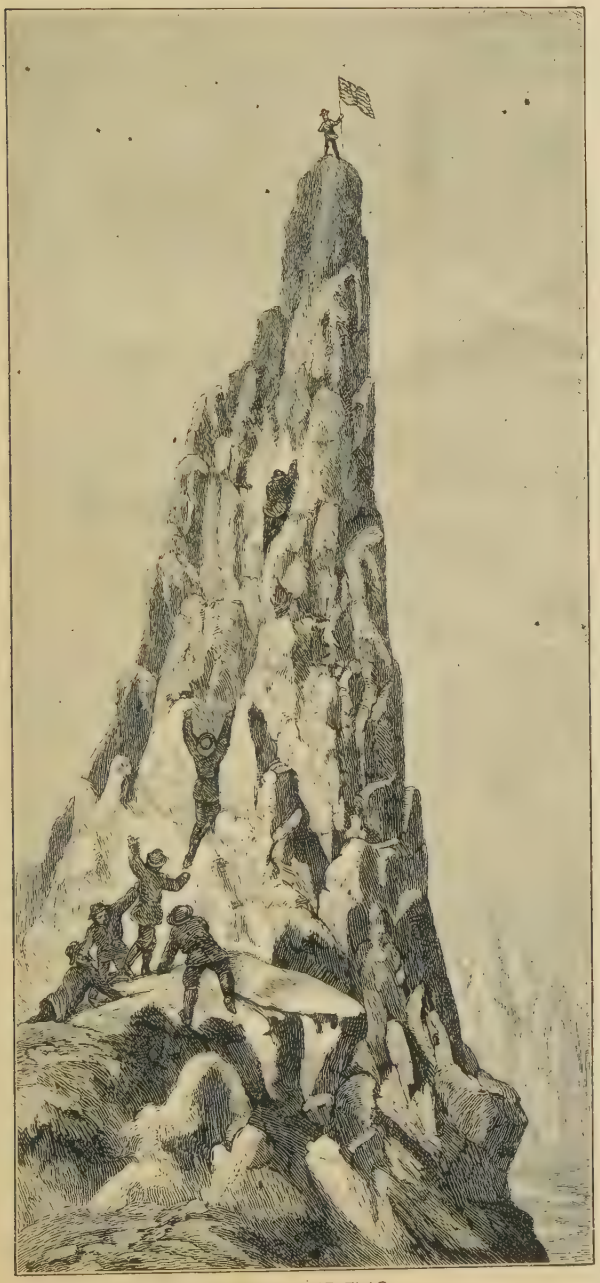
THE remarkable growth of the New West is one of its marvels. Less than fifty years ago, the larger part of it was known as the "GREAT AMERICAN DESERT." Reference to the accompanying maps of the New West as it was and as it is, will satisfy the reader that its surprising growth is truly a marvel.

It is only forty-five years since Fremont undertook his first exploring expedition, which embraced only a small portion of the New West, — that portion lying between the Missouri River and the Rocky Mountains, along the line of the Kansas and Great Platte rivers. It was regarded as a hazardous enterprise; and the hardships and perils of such an expedition were really appalling. The emigrant or hunter who succeeded in reaching the Rocky Mountains, without losing his scalp, was considered a fortunate man; for the savages of that day were blood-thirsty and cruel. War was the rule, and peace the exception with the Indians. The diary of one of the party says: —

"United with the Cheyenne and Gros Ventie Indians, the Sioux were scouring the upper country in war parties of great force, and were at this moment in the neighborhood of the *Red Buttes*, a famous landmark which was directly on our path. They had declared war upon every living thing which should be found westward of that point."

It is only a little more than thirty years since the same fearless explorer, on his fourth expedition, saw his men perish by cold and hunger in the Rocky Mountains. In a letter to his father-in-law, Thomas H. Benton, Fremont said: "Letters which I have forwarded to Mr. St. Vrain will inform you that we were overtaken by deep snows in the Rocky Mountains at the head of the Del Norte. We lost all our animals and ten men, — the mules frozen, and the men starved to death, Prone only excepted. He was frozen. The miscarriage of an express party, sent in under Mr. King, was a secondary cause of our greatest calamity in the loss of our men. In six days after leaving my camp in the mountains, I overtook his party, they

having been out twenty-two days, and King having been starved to death. In four days afterwards I reached the settlements in time to save many, but too late to rescue all the men." His diary, at one time, contained the following: "The meat train did not arrive this evening, and I gave Godey leave to kill our little dog (Kamath), which he prepared in Indian fashion, — scorching off the hair, and washing the skin with soap and snow, and then cutting it up into pieces which were laid on the snow. We had to-night an extraordinary dinner — pea-soup, mule, and dog."



RAISING THE FLAG.

These sufferings and perils were endured to find a passage for civilization across the New West to the Pacific Slope, where now pleasure-parties ride in Pullman cars; and where, within thirty years, some of the thriftiest cities of the world have risen like magic upon Indian hunting grounds.

It was Fremont who planted the American flag, less than fifty years ago, upon what was then supposed to be the highest peak of the Rocky Mountains, where now the tide of commerce rolls. Fremont thus describes the place from which he ascended the peak, which he called Snow Peak, because its summit bore a burden of snow under a bright August sun. "We soon had the satisfaction to find ourselves riding along the huge wall which forms the central summit of the chain. There at last it rose by our sides, a nearly perpendicular wall of granite, terminating two thousand to three thousand feet above our heads, in a serrated line of broken, jagged cones. We rode on until we came almost immediately below the main peak. Here were three small lakes of a green color, each of perhaps a thousand yards in diameter, and apparently very deep."

He described his climbing the peak as follows: —

"Having divested ourselves of every unnecessary encumbrance, we commenced the ascent. This time, like experienced travellers, we did not press ourselves, but climbed leisurely, sitting down so soon as we found breath beginning to fail. At intervals, we reached places where a number of springs gushed from the rocks, and about one thousand eight hundred feet above the lakes came to the snow line. From this point our progress was uninterrupted climbing. Hitherto, I had worn a pair of thick moccasins, with soles of *parflêche*;[1] but here I put on a light thin pair, which I had brought for the purpose, as now the use of our toes became necessary to a further advance. I availed myself of a sort of comb of the mountain, which stood against the wall like a buttress, and which the wind and the solar radiation, joined to the steepness of the smooth rock, had kept almost entirely free from snow. Up this I made my way rapidly. . . . Putting hands and feet in the crevices between the blocks, I succeeded in getting over it, and, when I reached the top, found my companions in a small valley below. Descending to them we continued climbing, and in a short time reached the crest. I sprung upon the summit, and another step would have precipitated me into an immense snow-field five hundred feet below. To the edge of this field was a sheer icy precipice; and then, with a gradual fall, the field sloped off for about a mile, until it struck the foot of another lower ridge. I stood on a narrow crest about three feet in width, with an inclination of about 20° N. 51° E. As soon as I had grati-

[1] "*Parflêche* is the name given to buffalo hide. The Indian women prepare it by scraping and drying. It is exceedingly tough and hard, and receives its name from the circumstance that it cannot be pierced by arrows or spears."

fied the first feelings of curiosity, I descended, and each man ascended in his turn; for I would only allow one at a time to mount the unstable and precarious slab, which it seemed a breath would hurl into the abyss below. We mounted the barometer in the snow of the summit, and, fixing a ramrod in a crevice, unfurled the national flag to wave in the breeze where flag never waved before. During our morning's ascent, we had met no sign of animal life, except a small bird having the appearance of a sparrow. A stillness the most profound and a terrible solitude forced themselves constantly on the mind as the great features of the place. . . . According to the barometer, the little crest of the wall on which we stood was *three thousand five hundred and seventy feet* above our camp, and *two thousand seven hundred and eighty* above the little lakes at the bottom immediately at our feet.

"Having now made what observation our means afforded, we proceeded to descend. We had accomplished an object of laudable ambition, and beyond the strict order of our instructions. We had climbed the loftiest peak of the Rocky Mountains, and looked down upon the snow a thousand feet below; and, standing where never human foot had stood before, felt the exultation of first explorers. It was about two o'clock when we left the summit; and when we reached the bottom, the sun had already sunk behind the wall, and the day was drawing to a close. It would have been pleasant to have lingered here and on the summit longer; but we hurried away as rapidly as the ground would permit, for it was an object to regain our party as soon as possible, not knowing what accident the next hour might bring forth."

Fremont's later expedition (1849) was attended by hardships and sufferings almost unparalleled, showing so striking a contrast with the comforts of civilization now in the same locality, as to seem incredible. The following letter to his wife gives, in detail, a terrible experience, which nearly cost him his life, where now tourists go for pleasure: —

TAOS, NEW MEXICO, Jan. 27, 1849.

My Very Dear Wife, — I write to you from the house of our good friend Carson. This morning a cup of chocolate was brought to me while yet in bed. To an overworn, overworked, much fatigued, and starving traveller, these little luxuries of the world offer an interest which in your comfortable home it is not possible for you to conceive. While in the enjoyment of this luxury, then, I pleased myself in imagining how gratified you would be in picturing me here in Kit's care, whom you will fancy constantly occupied and constantly uneasy in endeavoring to make me comfortable. How little could you have dreamed of this while he was enjoying the pleasant hospi-

tality of your father's house! The furthest thing then from your mind was that he would ever repay it to me here.

But I have now the unpleasant task of telling you how I came here. I had much rather write you some rambling letters in unison with the repose in which I feel inclined to indulge, and talk to you about the future, with which I am already busily occupied; about my arrangements for getting speedily down into the more pleasant climate of the lower Del Norte, and rapidly through into California; and my plans when I get there. I have an almost invincible repugnance to going back among scenes where I have endured much suffering, and for all the incidents and circumstances of which I feel a strong aversion. But as clear information is absolutely necessary to you, and to your father more particularly still, I will give you the story now, instead of waiting to tell it to you in California. But I write in the great hope that you will not receive this letter. When it reaches Washington, you may be on your way to California.

Former letters have made you acquainted with our journey so far as Bent's Fort, and, from report, you will have heard the circumstances of our departure from the Upper Pueblo of the Arkansas. We left that place about the 25th of November, with upwards of a hundred good mules, and one hundred and thirty bushels of shelled corn, intended to support our animals across the snow of the high mountains, and down to the lower parts of the Grand River tributaries, where usually the snow forms no obstacle to winter travelling. At the Pueblo, I had engaged as a guide an old trapper, well known as "Bill Williams," and who had spent some twenty-five years of his life in trapping in various parts of the Rocky Mountains. The error of our journey was committed in engaging this man. He proved never to have in the least known, or entirely to have forgotten, the whole region of country through which we were to pass. We occupied more than half a month in making the journey of a few days, blundering a tortuous way through deep snows, which already began to choke up the passes, for which we were obliged to waste time in searching. About the 11th December we found ourselves at the north of the Del Norte Cañon, where that river issues from the St. John's Mountain, one of the highest, most rugged, and impracticable of all the Rocky Mountain ranges, inaccessible to trappers and hunters even in the summer time. Across the point of this elevated range our guide conducted us; and, having still great confidence in his knowledge, we pressed onwards with fatal resolution. Even along the river bottoms the snow was already belly-deep for the mules, frequently snowing in the valley, and almost constantly in the mountains. The cold was extraordinary; at the warmest hours of the day (between one and two) the thermometer (Fahrenheit) standing, in the shade of only a tree trunk, at zero; the day sunshiny, with a moderate breeze. We pressed up towards the summit, the snow deepening, and, in four or five days, reached the naked ridges which lie above the timbered country, and which form the dividing grounds between the waters of the Atlantic and Pacific oceans. Along these naked ridges it storms nearly all winter, and the winds sweep across them with remorseless fury. On our first attempt to cross we encountered a *poudrerie*,[1] and were driven back, having some ten or twelve men variously frozen, — face, hands, or feet. The guide came very nigh being frozen to death here, and dead mules were already lying about the fires. Meantime it snowed steadily. The next day we

[1] Dry snow driven through the air by violent wind, and in which objects are visible only at a short distance.

made mauls, and, beating a road or trench through the snow, crossed the crest in defiance of the *poudrerie*, and encamped immediately below in the edge of the timber. The trail showed as if a defeated party had passed by: pack-saddles and packs, scattered articles of clothing, and dead mules strewed along. A continuance of stormy weather paralyzed all movement. We were encamped somewhere about twelve thousand feet above the sea. Westward, the country was buried in deep snow. It was impossible to advance, and to turn back was equally impracticable. We were overtaken by sudden and inevitable ruin. It so happened that the only places where any grass could be had were the extreme summit of the ridges, where the sweeping winds kept the rocky ground bare, and the snow could not lie. Below

ENCOUNTERING THE BLIZZARD.

these, animals could not get about, the snow being deep enough to bury them. Here, therefore, in the full violence of the storms, we were obliged to keep our animals. They could not be moved either way. It was instantly apparent that we should lose every animal.

I determined to recross the mountain more towards the open country, and haul or pack the baggage (by men) down to the Del Norte. With great labor the baggage was transported across the crest to the head springs of a little stream leading to the main river. A few days were sufficient to destroy our fine band of mules. They generally kept huddled together, and as they froze, one would be seen to tumble down and the snow would cover him; sometimes they would break off and rush down towards the timber, until they were stopped by the deep snow, where they were soon hidden by the *poudrerie*. The courage of the men failed fast; in fact, I

have never seen men so soon discouraged by misfortune as we were on this occasion; but, as you know, the party was not constituted like the former ones. But among those who deserve to be honorably mentioned, and who behaved like what they were, — men of the old exploring party, — were Godey, King, and Taplin; and first of all, Godey. In this situation, I determined to send in a party to the Spanish settlements of New Mexico for provisions and mules, to transport our baggage to Taos. With economy, and after we should leave the mules, we had not two weeks' provisions in the camp. These consisted of a store which I had reserved for a hard day, macaroni and bacon. From among the volunteers I chose King, Brackenridge, Creutzfeldt, and the guide Williams: the party under the command of King. In case of the least delay at the settlements, he was to send me an express. In the meantime we were to occupy ourselves in removing the baggage and equipage down to the Del Norte, which we reached with our baggage in a few days after their departure (which was the day after Christmas). Like many a Christmas for years back, mine was spent on the summit of a wintry mountain, my heart filled with gloomy and anxious thoughts, with none of the merry faces and pleasant luxuries that belong to that happy time. You may be sure we contrasted much of this with the last at Washington, and speculated much on your doings, and made many warm wishes for your happiness. Could you have looked into Agrippa's glass for a few moments only! You remember the volumes of Blackstone which I took from your father's library, when we were overlooking it at our friend Brant's? They made my Christmas amusements. I read them to pass the heavy time and forget what was around me. Certainly you may suppose that my first law lessons will be well remembered. Day after day passed by and no news from our express party. Snow continued to fall almost incessantly on the mountain. The spirits of the camp grew lower. Proue lay down in the trail and froze to death. In a sunshiny day, and having with him means to make a fire, he threw his blankets down in the trail and lay there till he froze to death. After sixteen days had elapsed from King's departure, I became so uneasy at the delay that I decided to wait no longer. I was aware that our troops had been engaged in hostilities with the Spanish Utahs and Apaches, who range in the North River valley, and became fearful that they (King's party) had been cut off by these Indians; I could imagine no other accident. Leaving the camp employed with the baggage and in charge of Mr. Vincenthaler, I started down the river with a small party, consisting of Godey (with his young nephew), Mr. Preuss and Saunders. We carried our arms and provision for two or three days. In the camp the messes had provisions for two or three meals, more or less, and about five pounds of sugar to each man. Failing to meet King, my intention was to make the Red River settlement, about twenty-five miles north of Taos, and send back the speediest relief possible. My instructions to the camp were, that if they did not hear from me within a stated time, they were to follow down the Del Norte.

On the second day after leaving camp we came upon a fresh trail of Indians, — two lodges, with a considerable number of animals. This did not lessen our uneasiness for our people. As their trail, when we met it, turned and went down the river, we followed it. On the fifth day we surprised an Indian on the ice of the river. He proved to be a Utah, son of a Grand River chief we had formerly known, and behaved to us in a friendly manner. We encamped near them at night. By a present of a rifle, my two blankets, and other promised rewards when we should get in, I prevailed upon this Indian to go with us as a guide to the Red River settlement, and take with him four of his horses, principally to carry our little baggage.

These were wretchedly poor, and could get along only in a very slow walk. On that day (the sixth) we left the lodges late, and travelled only some six or seven miles. About sunset we discovered a little smoke in a grove of timber off from the river, and thinking perhaps it might be our express party on its return, we went to see. This was the twenty-second day since they had left us, and the sixth since we had left the camp. We found them, — three of them, — Creutzfeldt, Brackenridge, and Williams, the most miserable objects I have ever seen. I did not recognize Creutzfeldt's features when Brackenridge brought him up to me and mentioned his name. They had been starving. King had starved to death a few days before. His remains were some six or eight miles above, near the river. By aid of the horses, we carried these three with us to Red River settlement, which we reached (Jan. 20) on the tenth evening after leaving our camp in the mountains, having travelled through snow and on foot one hundred and sixty miles. I look upon the anxiety which induced me to set out from the camp as an inspiration. Had I remained there waiting the party which had been sent in, every man of us would probably have perished.

The morning after reaching the Red River town, Godey and myself rode on to the Rio Hondo and Taos, in search of animals and supplies, and on the second evening after that on which we had reached Red River, Godey had returned to that place with about thirty animals, provisions, and four Mexicans, with which he set out for the camp on the following morning. On the road he received eight or ten others, which were turned over to him by the orders of Major Beale, the commanding officer of this northern district of New Mexico. I expect that Godey will reach this place with the party on Wednesday evening, the 31st. From Major Beale I received the offer of every aid in his power, and such actual assistance as he was able to render. Some horses which he had just recovered from the Utahs were loaned to me, and he supplied me from the commissary's department with provisions which I could have had nowhere else. I find myself in the midst of friends. With Carson is living Owens, and Maxwell is at his father-in-law's, doing a very prosperous business as a merchant and contractor for the troops.

TAOS, NEW MEXICO, Feb. 6, 1849.

After a long delay, which had wearied me to the point of resolving to set out again myself, tidings have at last reached me from my ill-fated party. Mr. Haler came in last night, having, the night before, reached Red River settlement, with some three or four others. Including Mr. King and Proue, we have lost eleven of our party. Occurrences, after I left them, are briefly these, so far as they are within Haler's knowledge. I say briefly, my dear Jessie, because now I am unwilling to force myself to dwell upon particulars. I wish for a time to shut out these things from my mind, to leave this country, and all thoughts and all things connected with recent events, which have been so signally disastrous as absolutely to astonish me with a persistence of misfortune, which no precaution has been adequate on my part to avert.

You will remember that I had left the camp with occupation sufficient to employ them for three or four days, after which they were to follow me down the river. Within that time I had expected the relief from King, if it was to come at all.

They remained where I had left them seven days, and then started down the river. Manuel — you will remember Manuel, the Cosumne Indian — gave way to a

feeling of despair after they had travelled about two miles, begged Haler to shoot him, and then turned and made his way back to the camp, intending to die there, as he doubtless soon did. They followed our trail down the river, — twenty-two men they were in all. About ten miles below the camp, Wise gave out, threw away his gun and blanket, and a few hundred yards further fell over into the snow and died. Two Indian boys, young men, countrymen of Manuel, were behind. They rolled up Wise in his blanket and buried him in the snow on the river bank. No more died that day; none the next. Carver raved during the night, his imagination wholly occupied with images of many things which he fancied himself eating.

LEAVING THE WEAK TO DIE.

In the morning, he wandered off from the party, and probably soon died. They did not see him again. Sorel on this day gave out and lay down to die. They built him a fire, and Morin, who was in a dying condition, and snow-blind, remained. These two did not probably last till the next morning. That evening, I think, Hubbard killed a deer. They travelled on, getting here and there a grouse, but probably nothing else, the snow having frightened off the game. Things were desperate, and brought Haler to the determination of breaking up the party, in order to prevent them from living upon each other. He told them "that he had done all he could for them, that they had no other hope remaining than the expected relief, and that their best plan was to scatter and make the best of their way in small parties down the river. That, for his part, if he was to be eaten, he would, at all

events, be found travelling when he did die." They accordingly separated. With Mr. Haler continued five others and the two Indian boys. Rohrer now became very despondent; Haler encouraged him by recalling to mind his family, and urged him to hold out a little longer. On this day he fell behind, but promised to overtake them at evening. Haler, Scott, Hubbard, and Martin agreed that if any one of them should give out, the others were not to wait for him to die, but build a fire for him and push on. At night Kern's mess encamped a few hundred yards from Haler's, with the intention, according to Taplin, to remain where they were until the relief should come, and in the meantime to live upon those who had died, and upon the weaker ones as they should die. With the three Kerns were Cathcart, Andrews, McKie, Stepperfeldt, and Taplin.

Ferguson and Beadle had remained together behind. In the evening Rohrer came up and remained with Kern's mess. Mr. Haler learnt afterwards from that mess that Rohrer and Andrews wandered off the next day and died. They say they saw their bodies. In the morning Haler's party continued on. After a few hours Hubbard gave out. They built him a fire, gathered him some wood, and left him, without, as Haler says, turning their heads to look at him, as they went off. About two miles further, Scott — you remember Scott, who used to shoot birds for you at the frontier — gave out. They did the same for him as for Hubbard, and continued on. In the afternoon the Indian boys went ahead, and before nightfall met Godey with the relief. Haler heard and knew the guns which he fired for him at night, and starting early in the morning, soon met him. I hear that they all cried together like children. Haler turned back with Godey, and went with him to where they had left Scott. He was still alive and was saved. Hubbard was dead, — still warm. From the Kerns' mess they learned the death of Andrews and Rohrer, and a little above met Ferguson, who told them that Beadle had died the night before.

Godey continued on with a few New Mexicans and pack mules to bring down the baggage from the camp. Haler, with Martin and Bacon, on foot, and bringing Scott on horseback, have first arrived at the Red River settlement. Provisions, and horses for them to ride, were left with the others, who preferred to rest on the river until Godey came back. At the latest, they should all have reached Red River settlement last night, and ought all to be here this evening. When Godey arrives, I shall know from him all the circumstances sufficiently in detail to enable me to understand clearly everything. But it will not be necessary to tell you anything further. It has been sufficient pain for you to read what I have already written.

When I think of you all, I feel a warm glow at my heart, which renovates it like a good medicine, and I forget painful feelings in strong hope for the future. We shall yet, dearest wife, enjoy quiet and happiness together — these are nearly one and the same to me now. I make frequently pleasant pictures of the happy home we are to have, and oftenest, and among the pleasantest of all, I see our library with its bright fire in the rainy stormy days, and the large windows looking out upon the sea in the bright weather. I have it all planned in my own mind. It is getting late now. La Harpe says that there are two gods which are very dear to us, — Hope and Sleep. My homage shall be equally divided between them; both make the time pass lightly until I see you, and so I go now to pay a willing tribute to the one with my heart full of the other. Good night.

No longer ago than 1854 Colonel Thomas H. Benton, of national reputation, and his son-in-law, John C. Fremont, whose explorations from the Missouri River to the Pacific coast had made him known world-wide, became enthusiastic over the project of building a railroad over the Rocky Mountains. Fremont's last two expeditions were undertaken, at his own and Colonel Benton's expense, for the purpose, mainly, of settling the question whether it would be practicable to run cars over the Rocky Mountains in the winter, when storms are terrific and snows deep.

It was necessary for Fremont to undertake his expeditions in winter-time, in order to test the question satisfactorily. We need scarcely say that the hardships and perils of such an enterprise were many and great. Fremont and his men never learned more of cold and hunger by experience than they did in that expedition. At one time, as news from the explorers had not been received for several weeks, the public feared that the whole party had perished. The *National Intelligencer* of April 12, 1854, said: —

"It gives us great pleasure to insert the subjoined letter from Colonel Fremont, not only because it contradicts the exaggerated reports of deaths sustained by his party, and assures us of the intrepid explorer's own safety, after his two months' bold journey through the mountain wilds in midwinter, but because his success seems fully to have established the favorable nature of the central route for a railroad, in winter as well as summer."

Bear in mind, reader, that our purpose is to show the marvel of enterprise in the New West, which can be done well only by a clear and distinct understanding of the condition of the country west of the Missouri physically, as well as socially and morally, less than forty years ago. Such experience as that of Fremont seems scarcely possible to the tourist now, who travels from the Missouri River to San Francisco in a Pullman car in four days.

Before the discovery of gold in California, in 1848, few but explorers, fur-traders, trappers, and hunters, ventured to cross the Missouri River into the wilderness. The discovery of gold, however, on the Pacific Slope, created the wildest enthusiasm throughout the land, and a tide of emigration to California set in. Hundreds and thousands of ill-fated adventurers crossed the Missouri, to die by savage violence or starvation on the "Great Plains" or in the mountains. The tragic end of individuals and companies who miserably perished on their way to the "Golden Gate," less than forty years ago, would fill volumes with tales more harrowing than fiction. The

known starvation or massacre of one company of emigrants did not deter another from the hazardous undertaking. A continuous stream of men, wild with the gold-mania, poured over the plains and through the mountains, — some of them to success, but more to death.

Freighters called these baggage-wagons "prairie-schooners." Oxen, mules, and horses were used to draw them, from two to ten to each team. It was not unusual for oxen, horses, and mules to be hitched to the same "schooner." Emigrants travelled in caravans as much as possible, well armed, to protect themselves when savages attacked them. Wild beasts, wilder Indians, and "Latter-Day Saints" made the journey extremely perilous.

OVER THE PLAINS THEN.

The discovery of gold in Colorado, in 1858, created even greater excitement throughout the country than did its discovery ten years before in California. Emigration rolled towards the new Eldorado with unexampled rapidity. A more motley tide of humanity never set in, north, south, east, or west. The year 1859 will ever be memorable for the number and miscellaneous character of travellers to Pike's Peak. Old men and mere boys, educated and ignorant, saints and sinners, philanthropists and robbers, professional and lay, — all defied hunger, cold, nakedness, and Indians, in their red-hot enthusiasm for gold-digging. The "Great Plains" swarmed with all sorts of animals and vehicles, conveying men, and some women, with goods and chattels, to the gold region. It was not unusual for an ox, mule,

donkey, and even cow, to appear in the motley cavalcade, heavily loaded with the property of its enthused proprietor. The illustration is no fancy sketch: it represents what many men now living beheld on the Plains. It is claimed, even, that one party crossed the Plains, carrying his outfit on a wheelbarrow; and others drew hand-carts.

Many of the white-topped wagons bore amusing inscriptions, as follows: on a wagon drawn by two yoke of oxen, moving at a snail's pace, appeared in large letters, "Lightning Express"; on another

LIGHTNING EXPRESS.

wagon, "Pike's Peak or Bust"; on another, "Root Hog or Die"; and so on *ad infinitum*.

Few imagined what sufferings they might experience in their new adventure; most of them had their only laugh in the early part of their journey. The ox-team conveyed them to disappointment, hunger, and death in a briefer period than they dreamed of. Miss Hill, in her "Tales of Colorado Pioneers," has the following, which she received from one Mrs. Barney:—

"I was in the first coach of the 'Leavenworth and Pike's Peak Express Company,' which arrived in Denver on the seventh day of

May, 1859. The supply wagons were sent on ahead, locating the stations, and every twenty-five miles they would drop a tent, a stove, and a cook. At that season of the year the twilight is short, so when we drew up at the station for supper it was quite dark. When I entered the tent I saw the most soul-sickening sight that my eyes ever rested upon, and the flickering light of the candle added intensity to the horror. . . . The poor man, from starvation, was reduced to a living skeleton. He was in the last stages of exhaustion when an Indian found him and brought him to the tent. After he was refreshed with food and stimulants he told his sickening story.

"Three brothers set out from Illinois in a one-horse cart for the gold region. From Leavenworth they took the Smoky Hill route. Guided by incorrect ideas of the distance, they were poorly prepared for the hardships of the journey, and their provisions gave out before they were half way. They killed their horse for food and loaded their cart with it, taking turns in the harness of the slaughtered animal. It was tedious, and their strength was rapidly going. When the last piece of flesh was gone, they sat down in despair to die, for they had wandered away from the trail in search of water, and had no hope of being found by a human being. One sank faster than the others, and when dying requested the surviving brothers to live upon his flesh and try to get through. He died, and they commenced their cannibalistic feast — ate the body, and again saw starvation staring them in the face. Another died, which furnished food to the remaining brother.

"Mr. Williams, conductor of the Express, after hearing the story, had the Indian pilot him to the spot, where he found the bones of the one who died last, and buried them.

"We took the miserable, famished creature in the coach to Denver. His body regained health and strength, but his mind was gone. He remained always an imbecile. The citizens of Denver made up a purse and sent him to his friends in 'the States.'"

A story stranger than fiction has just been told us by a gentleman who reached Denver early in the spring of 1859. With two companions he drew a hand-cart, containing their effects, from Leavenworth, Kan., to Denver, Col., a distance of six hundred miles. On the way they crossed the route of a team from Texas, laden with flour and other stores. This gentleman purchased a sack of flour of the teamster, and transferred it to the hand-cart. On reaching Denver, where some thirty men had wintered, he found a scarcity of provision, and the Cherry Creek gold mania a delusion. There

was not a spoonful of flour in the camp; and as the search for gold had proved vain, there was a general desire among the men to escape from their dilemma. Our informant was offered a "corner lot" for one-half of his sack of flour, and two other lots in addition, for the whole of it. He refused the offer, thinking that he might need it to keep his own soul and body together. Neither he nor any one else dreamed of the influx of people, in six weeks from that time, when they came by the thousand; otherwise he would have parted with the

CROSSING THE PLAINS WITH A HAND-CART.

flour. Had he sold it for the three "lots," he would have realized, within three or six months, from eight thousand to ten thousand dollars for his sack of flour.

It is not strange that many of the best class of gold-seekers started homeward soon after reaching the gold country. Privations and home-sickness forced their return. In addition, a large class of shiftless characters, who supposed that nuggets of gold could be picked up anywhere in the vicinity of the Rocky Mountains, were maddened by disappointment, and they, too, stampeded. So that, for two or

three years, and longer, perhaps, the plains witnessed two large streams of humanity, one going to, and the other returning from, the gold country. The white-covered wagon that bore the inscription "Pike's Peak or Bust" on its outward trip, returned with this inscription under the former, "Busted by Thunder." Most of them declared that Pike's Peak as a gold region was a hoax. One D. C. Oakes, who had induced many men to go to Colorado by a pamphlet that he published, setting forth the richness of the gold mines, came near

PERILS OF D. C. OAKES.

losing his life. He had been to the "States," and was returning with a saw-mill, when he met a large company of returning fortune-seekers on the plains, who charged him with deceiving them, and threatened to destroy his mill and take vengeance on himself. But finally he was allowed to proceed, the exasperated stampeders contenting themselves with hurling hard names at him. Mr. Oakes had not proceeded far before he came upon a new-made grave, on which the bleached shoulder-blade of a buffalo lay, bearing the following inscription: —

"Here lies the body of
D. C. Oakes,
Killed for aiding the Pike's Peak hoax."

The party of disappointed gold-hunters who had just interviewed him had buried him in effigy. Subsequent developments proved that the gold-cry was not a hoax. There was plenty of gold, but many of its seekers lacked the enterprise, perseverance, and strength to find it.

CAPTURE OF "SPOTTED HORSE."

The Indians were a constant menace to the emigrants over the plains from the outset; and they continued their depredations, growing bolder and bolder, until their hostility culminated in the atrocities of 1864. "Spotted Horse" was a noted chief, who led a band of blood-thirsty Indians, causing a "reign of terror" in the valley of the Platte. Houses and cabins were attacked by the savages, and whole families, men, women, and children, murdered. For a distance of two hundred miles and more, Spotted Horse swept over the country with his painted warriors, burning, terrifying, robbing, and

murdering defenceless people. The government soldiers at Fort Kearney were of no more use than so many bundles of straw in checking these warlike demonstrations. The pioneers saw that unless death was meted out to Spotted Horse and his band, starvation and the tomahawk would exterminate them. So they moved in the matter as pioneers will, and the result was that Major Downing, with a part of the Colorado First Regiment, which had just returned from New Mexico, where it had been to conquer the rebellion, was ordered to take the field against the Indians. He immediately marched to the camp of the enemy, near the American ranch, one hundred and fifty miles from Denver, and pitched his tent a few miles distant from it. Miss Hill says: —

"As he sat in his camp one morning viewing the country through a field-glass, he saw a man dressed in citizen's clothes on the opposite side of the river. He immediately detached ten or twelve men to capture him, and if possible bring him to the camp alive; for he knew from his walk that he was an Indian, probably one of their scouts on a tour of observation.

"When brought into camp, he proved to be none other than the famous Spotted Horse.

"The Major surveyed him for a while in meditative serenity; then offered the Indian, who stood in sullen silence, his life, if he would surrender his band. This he refused to do.

"He then ordered his men to drive a stake and prepare to roast the Indian alive.

"The chief gathered his coat about him, and sat contemplating his funeral pyre with stoical indifference.

"When the fire was kindled the Major gave orders to bind him to the stake, saying, 'You have seen many a white man die this horrible death, and now we propose to let you know how it is yourself.'

"This unnerved him; he pleaded for his life, and promised to lead the soldiers to his camp. The terms were agreed upon, and in the shortest possible time the command was moving, with Spotted Horse strapped on a horse in advance.

"They camped that night in a little ravine, and the chief informed them that his warriors were only a few miles ahead, up the cañon that they were approaching.

"About eleven o'clock at night the Major and his command stole away, leaving the camp-fires burning to make the Indian scouts believe that they were still there. Reaching the spot designated by Spotted

Horse early in the morning, the order was given to halt and form in line of battle.

"At a given signal he opened fire. The Indians made a bold resistance, but finally surrendered.

"This was the first Indian battle in Colorado, and the result was, forty killed and one hundred wounded, their village destroyed and their chief a prisoner."

Then the Third Regiment was enlisted for a hundred days in a campaign against the Indians. On the 29th of November Governor

PERILS BY INDIANS.

Evans issued a proclamation of war against the Arapahoes, Cheyennes, Sioux, and all others who were raiding upon the settlers. The battle of Sand Creek, led by Colonel Chivington, followed, in which the savages were conquered. Colonel Chivington was charged with unnecessary brutality by men who knew little about the affair, because the Indians were generally slaughtered. But the Western people, who understood the situation well, have not ceased to praise Colonel Chivington and his heroic command for removing the cause of their chief calamities. That battle put an end to the Indian hos-

tilities for fifteen years, and relieved a terror-stricken people as no conciliatory policy could have done.

In September, 1883, the Pike's Peak Pioneers of '58 celebrated, in Denver, the twenty-fifth anniversary of their arrival in the gold country; and, at the banquet, Colonel Chivington, by request, gave an account of the Sand Creek battle, which we quote here, in justice to a patriotic and fearless officer: —

"After many requests, I write this brief and hasty sketch of that famous, or infamous, battle — famous, when looked upon by those who know most about it; infamous, when looked at by those who know least of it. Years have fled away; the smoke of battle has lifted; and time, the Great Revealer, has placed his seal upon this and contemporary events. If anything can be justified by its effects, then the noble, daring, sacrificing, heroic men, who left their lucrative employments and callings, to brook the hardships, privations, and dangers of a winter campaign on the plains, against the marauding, thieving, and murdering Cheyenne and Arapahoe Indians, must stand justified. Pre-eminently so.

"These men were not murderers of innocent, helpless women, as some silly people believe. What are the exact facts in the premises? On the 13th day of April, 1864, a herdsman, of Irvin, Jackman & Co., government freighters, came into district headquarters, and reported that the Cheyennes and Arapahoes had driven off about sixty head of their work-oxen and ten or twelve head of mules and horses from the winter camp on Kiowa, some thirty miles south of Denver. The district commander sent orders to Captain Sanborn, in command of troops on the Platte, below Denver, to send out a detachment to intercept the Indians where they would cross the river, and recover the stolen stock, and return it to its owners; but be careful, if possible, to avoid a fight with the Indians The troops were sent under command of Lieut. Clark Dunn, a careful and prudent officer. The Indians were overtaken, as was expected, just as they were crossing the river. Lieutenant Dunn crossed over to the side where the Indians were, and engaged them in a parley or talk about the stolen stock. While this was going on, Dunn discovered that the Indians were running off the stock. A blinding snow-storm was in progress; and Dunn told the chiefs that they must stop running the stock away, or he would be compelled to take it by force. This incensed the Indian chief so much that he gave a signal, and the Indians fired on the Lieutenant when in treaty under a flag of truce. Of course, the troops rode to the rescue of their officers. The

Indians outnumbered Dunn's forces four to one. Darkness had now set in. Hence, the Indians escaped with their booty.

"From this time on, all spring, summer, and autumn, these Indians, joined by others, were raiding the Platte and Arkansas river routes of travel, and the out-settlements and stockmen's herds, stealing horses, mules, and cattle; robbing and burning houses and other buildings, attacking trains loaded with merchandise for Denver merchants and traders, killing the drivers and those in charge, carrying off what they could, and burning the wagons and remaining contents; murdering and mutilating whole families, men, women, and children, in a manner too shocking to write or speak off. All these long months, and in the midst of general alarm, not only of those occupying the outposts, but of the dwellers occupying the villages, the men in the city of Denver feared for the worst. There were only troops in the district sufficient to escort and protect the United States mails, and garrison the posts and camps, and to send detachments in pursuit of raiding bands of Indians."

After rehearsing the manner of raising the Third Regiment, for a hundred days, and the hurried march to the scene of conflict, Colonel Chivington continues: —

"On the night of November 27, the command camped on the Arkansas River, eight miles above Fort Lyon; and the arrangement of the campaign may be judged of when it is stated that, on the morning of the 28th, the command broke camp, and marched into Fort Lyon, before the garrison of the post was aware of its approach. Here the command rested till dark, when — joined by two companies of the First Cavalry, of Colorado, under command of Maj. Scott J. Anthony — it marched for the camp of the hostiles, about forty miles distant. About midnight, the guide reported himself lost, and said that Jim Beckwith, on whom he had depended for the last part of the route, was so blind from age and cold, that he was not willing to proceed further till daylight. Major Anthony had Jack Smith, a half-breed Cheyenne, with his command, whose knowledge of the country was brought into requisition, and the command moved on, as noiselessly as possible, until within eight or ten miles of the Indian camp, when Jack told Colonel Chivington that any further advance would be likely to result in the Indians taking flight and running away; saying: 'Wolfe, he howle; Injun doge, he hear wolfe, and doge howle, too. Injun, he hear doge and listen, — hear something, and run off.' Colonel Chivington told Jack that he had not had an Indian to eat for some time, and if he fooled him, and did not take him to the camp

of the hostiles, that he would have him, 'Jack,' for breakfast. The march was resumed, and nothing more was heard of 'wolfe' and 'doge.' At early dawn, Colonel Chivington and Shoup, who were one-half or three-fourths of a mile in advance of the command, had the Indian camp pointed out to them by Jack Smith, who was at once sent to the rear. The column was halted, and two detachments were sent to cut off the herds of ponies, which were on two opposite sides of the camp, and probably each a mile out from camp. The officers in charge of these detachments were strictly commanded not to permit any firing on the Indians, unless they were first fired upon. The herd of ponies farthest from us took the alarm first, and headed and ran for camp. In cutting them off, the troops ran close into the tepee of the head chief, and were fired upon, and one soldier and his horse fell dead. This was the signal for a general fight, which it had hoped might be avoided by cutting off these mounts, and then a talk and terms. The whole command was ordered to advance and support the detachments, that were now under a heavy fire from the Indians, who had formed in line just above the camp. Colonel Chivington found the Indians too strong for his command to drive, until he succeeded in getting two twelve-pound brass howitzers to the front. The first shot from one of these broke the Indian lines, and a running fight ensued, lasting till it was so dark that an Indian could not be distinguished from a white man.

"There were many incidents on the field that would well bear mention. I will recite one. While sitting on my horse, glass in hand, about two o'clock P.M., I saw an officer fall from his horse. I galloped up, and found that he had been wounded with an arrow, and ordered two troopers near by to assist and protect him till the ambulance came to take him to the hospital tent. One of the soldiers, speaking excitedly, said: 'Look out, Colonel, the same squaw that shot the Major will shoot you!' and before I could dismount, and make my horse a breastwork, an arrow came whizzing past, and cut the rim off my left ear, so that it bled freely. At this, one of the soldiers brought his carbine to an aim, saying: 'If that squaw shows her head above the bank again, I will shoot the top off it.' His commander expostulated with him, saying, 'I would not waste my powder by killing a woman.' At this instant another arrow flew through the air, and pierced the arm of the highly civilized soldier, about four inches below the shoulder-joint. I had all my life some doubts about instantaneous conversions, but here it was as clear cut as was ever witnessed at an old-fashioned Methodist camp-meeting. Before, it

was the officer who was shot; now, it was himself. Before, he would not shoot a woman; now, he fairly shrieked, 'Shoot the dirty, red b——h!' and the order was obeyed; and the squaw was shot; and I approved it. If the fools in the East and elsewhere, who are still shouting themselves hoarse, could only have turned loose upon them for a little time a band of hostile Cheyennes, and I could witness the scene, I would be more than compensated for all the mean things they have said and are saying about me and the troops under my command at Sand Creek.

"The number of Indians killed, as near as I could estimate from the reports of company and battalion commanders, was from five hundred to seven hundred and fifty. I am inclined to think the latter number nearest correct. We captured a large number of ponies, mules, and horses. From these I allowed the men of the command, whose horses had died or given out on the march, to choose another, and ordered the remainder of them to be turned over to Capt. Dandow Mullen, Assistant Quartermaster of volunteers at Denver, which was done, and Captain Mullen sold them at public auction and accounted for the proceeds in his returns to the Quartermaster's department. We burned the tepees, or tents, destroyed their provisions, turned over to the hospital the robes and blankets we took for the benefit of our sick and wounded, of whom we now had a large number.

"Was Sand Creek a massacre? If it was, we had massacres almost without number during the late rebellion. That there may have been some excesses committed on the field, no one will deny. Was there ever a battle fought in which no excesses were committed? We were on the ground, were 'wide awake and duly sober'; there were not ten minutes at a time for ten hours that we were not overlooking the whole scene of strife; and after nineteen years, less two and a half months, we say unhesitatingly that it was remarkably free from undue atrocities. I saw in a newspaper within a month that Gen. S. R. Curtis, commanding the department, denied all responsibility for the whole affair. Here is his last word by telegraph to the district commander: 'Pursue everywhere and punish the Cheyennes and Arapahoes; pay no attention to district lines. No presents must be made and no peace concluded without my order.' It has been an open secret to the writer ever since the battle that the misrepresentation of this whole affair from the beginning was a combination consisting of one man who was disappointed of promotion, and some others who were aspirants for office and wanted several con-

nected with the campaign out of their way. I heard a judge of common pleas in Ohio, a Friend Quaker, and colonel of an Ohio regiment during the Rebellion, say only last week, when this subject was on the tapis, that he was expecting to be arrested pretty soon, and when asked why, he said, 'I captured three Rebel soldiers who had Fort Pillow blazoned on the front of their hats. I sent them to the rear under guard of three soldiers. The soldiers returned to camp, and I asked them what had become of the prisoners. They replied that they had tried to escape and they had shot them, and I knew very well that they had shot them because of their boast that they had participated in the Fort Pillow affair, and did not arrest them because I thought they did about half right.' Take the report of the committee on the conduct of the war in the matter of General Sherman's having ten thousand men slaughtered by the rebels only just to show Pemberton, or some other rebel commander, that he would fight. No man can afford to be tried by a star-chamber court.

"But were not these Indians peaceable? Oh, yes; peaceable! Well, a few hundred of them have been peaceable for almost nineteen years, and none of them have been so troublesome as they were before Sand Creek. What are the facts? How about that treaty that Governor John Evans did not make with them in the summer of 1864? He, with Major Lowe, Major Whiteley, two of his Indian agents, and the usual corps of *attachés* under escort, went out on the Kiowa to treat. When he got there they had gone a day's march further out on the plains and would meet him there, and so on, day after day they moved out as he approached, until, wearied out, and suspicious of treachery, he returned without succeeding in his mission of peace. He told them by message that he had presents for them; but it was not peace and presents they wanted, but war and plunder.

"What of the peaceableness of their attack on General Blunt's advance guard north of Fort Larned, almost annihilating the advance before succor could reach them? What of the dove-like peace of their attack on the government train on Walnut Creek, east of Fort Larned, under the guise of friendship, till the drivers and *attachés* of the train were in their power, and by a signal struck down at once every man, only a boy of thirteen years barely escaping, and he with a loss of his scalp, taken to his ears, and he finally died?

"That was a very friendly act these Indians did when they run the entire herd of stock at Fort Larned one Sunday morning after they drew their rations for the succeeding week. This herd consisted of all the cavalry and artillery horses, all the quartermaster's

animals, and all the beef cattle belonging to the caravansary departments at the post. What of the trains captured from Walnut Creek to Sand Creek on the Arkansas route, and from the Little Blue to the Kiowa on the Platte route? Of supplies and wagons burned and carried off, and of the men killed? What of the massacre of the Hunyan family? Alas! what of the stock, articles of merchandise, fine silk dresses, infants' and youths' apparel, the embroidered night-gowns and chemises? Aye, what of the scalps of white men, women, and children, several of which they had not had time to dry and tan since taken? These, all these, and more, were taken from the belts of dead warriors on the battle-field of Sand Creek, and from their teepes which fell into our hands on the twenty-ninth day of November, 1864. What of that Indian blanket that was captured, fringed with white women's scalps? What says the sleeping dust of the two hundred and eight men, women, and children, ranchers, emigrants, herders, and soldiers, who lost their lives at the hands of these Indians? Peaceable! Now we are peaceably disposed, but decline giving such testimonials of our peaceful proclivities; and I say here, as I said in my own town in the Quaker county of Clinton, State of Ohio, in a speech one night last week, — I stand by Sand Creek."

Colonel Chivington "stands by Sand Creek," and we stand by him, as we think every faithful chronicler of history must do.

The hardships and sufferings of the pioneers in those days, though less than thirty years ago, may be learned from one of the pioneer women, — Mrs. Augusta Tabor. Miss Hill narrates the experience of Mrs. Tabor as follows, as she heard it from Mrs. Tabor herself: —

"My first acquaintance with Horace Austin Warner Tabor came about in this way: my father, a stone contractor, took the train one morning in August, 1853, for Boston, to hire stone-cutters. When about sixty miles from home two young men entered the train, one of them taking a seat by my father. In conversation it was developed that these men were stone-cutters and looking for work. My father employed them. In two years from that time Mr. Tabor, who was one of the men, asked my hand in marriage. Another two years passed, and in January, 1857, we were married in the room where we first met.

"On the 25th of February we left my home in Augusta, Me., for our new one in Kansas. We made our way to St. Louis, which was the terminus of the railroad, thence to Kansas City on a five-day boat. At Kansas City we purchased a yoke of oxen, a wagon, a few farming tools, some seed, took my trunks and started westward. My

trip was not very pleasant, for the wind blew disagreeably, as it always does in Kansas.

"We arrived at our destination on the 19th of April at 11 A.M. I shall never forget that morning. To add to the desolation of the place, the wind took a new start. The cabin stood solitary and alone upon an open prairie. It was built of black walnut logs, 12 x 16 feet; not a building, a stone, or stick in sight. We had brought two men with us, and how we could all live in that little place was a question I asked myself many times. The only furniture was a No. 7 cook stove, a dilapidated trunk, and a rough bedstead made of poles, on which was an old tick filled with prairie grass. I sat down upon the

MRS. TABOR'S CABIN.

trunk and cried; I had not been deceived in coming to this place. I knew perfectly well that the country was new, that there were no saw-mills near, and no money in the territory. But I was homesick, and could not conceal it from those about me.

"Mr. Tabor and the two men unloaded the wagon while I tried to clean up the cabin. I found a number of old New York *Tribunes* in the room, smoothed them out, made a paste of flour, and soon had the black, ugly logs covered, putting the newspapers right side up, that I might read them at my leisure, for I could see that reading matter was likely to be very scarce. Having covered the walls, I unpacked the boxes and made up a decent bed. I took out my table-linen and silver, for I had not left home without the usual outfit, and

then began to prepare my first meal. I cannot say that it was very inviting, but I did the best I could, and we were all blessed with good appetites. The two men took rooms near by and boarded with us, thus helping us to money to support the table. Mr. Tabor broke the land, put in the seed, and began farming in good earnest, exchanging day's labor with the neighbors to save hiring help. In this way our pioneer farm was started.

"No rain fell that summer, so that when harvest came we had nothing to gather. Mr. Tabor went to Fort Riley and worked at his trade, while I remained at home with my babe, and made a little money by raising chickens.

"Indians and snakes were then numerous in Kansas, and I lived in constant dread of both. I cannot tell which I feared the most. The rattlesnakes crawled into my cabin to get into the shade, and when I sat down it would be upon a three-legged stool with my feet under me.

"The winter was warm and pleasant. When spring came we tried farming once more. An abundant crop resulted, but there was no market for it; eggs were three cents per dozen, and shelled corn twenty cents per bushel. I kept boarders and made some butter to sell. In February, 1859, Mr. Tabor heard of Pike's Peak, through some one of Green Russell's party who was returning, and at once decided to try his luck in the new Eldorado. I had my choice to return to my parents in Maine or remain with my husband and cast in my lot with him. After canvassing the subject with much reflection, it was settled that I should remain, as the more practicable course to be pursued. The two men decided to go along with us. Mr. Tabor worked at the Fort through March and April.

"The fifth day of April we gathered together our scanty means, bought supplies for a few months, yoked our oxen and cows, mounted our seats in the wagon, and left the town of Zeandale with the determination of returning in the fall, or as soon as we had made money enough to pay for the one hundred and sixty acres of government land, and buy a little stock.

"What I endured on this journey only the women who crossed the plains in 1859 can realize. There was no station until we arrived within eighty miles of Denver, *via* the Republican route; no road and a good part of the way no fuel.

"We were obliged to gather buffalo chips, sometimes travelling miles to find enough to cook a meal with. This weary work fell to the women, for the men had enough to do in taking care of the

teams, and in 'making' and 'breaking' the camp. The Indians followed us all the time, and were continually begging and stealing.

"Every Sunday we rested, if rest it could be called. The men went hunting, while I stayed to guard the camp, wash the soiled linen, and cook for the following week. Quite frequently the Indians gathered around my camp, so that I could do nothing all day. They wallowed in the water-sources from which our supplies were obtained, and were generally very filthy. My babe was teething and suffering from fever and ague, so that he required constant attention day and night. I was weak and feeble, having suffered all the time that I lived in Kansas with ague. My weight was only ninety pounds.

"We arrived in Denver about the middle of June, and as our cattle were footsore we were obliged to camp there until the first day of July. Then we went up Clear Creek where the town of Golden was being established. A miner came down from the mountains, from whom we inquired the way to Gregory diggings. With the information derived from him, Mr. Tabor concluded to go on a prospecting tour. So, on the morning of the Fourth of July, the men took a supply of provisions on their backs, with a few blankets, and, leaving one of the party to keep me company, pushed forward into the mountains, hopeful of success. They were absent three weeks, and to me they were three very lonely, wearisome weeks, although wagons were camped around and Golden City was a half-mile away. A vast wilderness, whose silence was broken only by the lowing of cattle, stretched out on every side. Even to a pioneer woman, on whom the necessity of such experience was laid, the situation was one of indescribable isolation. On the 26th of July we again loaded the wagon and started into the mountains. The road was a mere trail; every few rods we were obliged to stop and widen it. Many times we unloaded the wagon, and, by pushing it, helped the cattle up the hills. Going down hill was so much easier, that it was often necessary to fasten a full-grown pine tree to the back of the wagon for a hold-back or brake. Often night overtook us where it was impossible to find a level place to spread a blanket. Under such circumstances we drove stakes in the ground, rolled a log against them, and lay with our feet against the log. Sometimes the hill was so steep that we slept almost upright. We were nearly three weeks cutting our way through Russell's Gulch into Payne's Bar, now called Idaho Springs.

"Ours was the first wagon through, and I was the first white woman there, if white I could be called, after camping out three

months. The men cut logs and laid them up four feet high, then put the 7x9 tent on for a roof. Mr. Tabor went prospecting. I opened a 'bakery,' made bread and pies to sell, gave meals, and sold milk from the cows we had brought.

"Here one of our party, Mr. Maxey, had an attack of mountain fever, and for four weeks he lay very ill at the door of our tent, in a wagon bed, I acting as physician and nurse. A miner with a gun-shot wound through his hand was also brought to my door for attention.

"With the first snow-storm came an old miner to our camp, who told us dreadful stories of snow-slides, and advised Mr. Tabor to take me out of the mountains immediately. Those who know anything of the surroundings of Idaho will smile at the idea of a snow-slide there. But we, in our ignorance of mountains, believed all the old miner said, and left for Denver.

"I had been very successful with my bakery in that camp, making enough to pay for the farm in Kansas and to keep us through the winter.

"Arriving in Denver, we rented a room over a store. It was the first roof I had slept under for six months. I took a few boarders, and Mr. Tabor returned to his prospect, which he found had been jumped by the miner who had advised us to leave. 'Might was right' in those days, so he lost all his summer's work, and had to sell the cow to buy the supply for the new camp, which was up the head-waters of the Arkansas.

"The 19th of February, 1860, I was lifted from a bed of sickness to a wagon, and we started for the new mining excitement. No woman had yet been there.

"We were seven days going to where Manitou now stands. I made biscuit with the water of the soda springs; they were yellow, and tasted so strongly of soda that even we, with our out-door appetites, could not relish them.

"We lingered there one week, the men doing a little prospecting, and working on a new road over the Ute Pass.

"We made such slow progress over this road that every evening we could look back and see the smoke from the camp-fire of the previous evening. After two weeks of such wearying travel, we reached South Park. I shall never forget my first vision of the park. The sun was just setting. I can only describe it by saying it was one of Colorado's sunsets. Those who have seen them know how glorious they are. Those who have not cannot imagine anything so gor-

geously beautiful. The park looked like a cultivated field, with rivulets coursing through, and herds of antelope in the distance. We camped on the bank of a clear stream, and the men went fishing. We had broiled trout that night for supper, and passed the evening over a game of whist by the light of our camp-fire.

"The fourth day in the park we came late at night to Salt Creek. Tried the water and found that we could not let the cattle drink it; neither could we drink it. We tied the oxen to the wagon and went supperless to bed. The night was very cold, and a jack came to our tent and stood in the hot embers until he burned his fetlocks off. He stayed with us to the end of our trip, and carried me many miles upon his back.

"We moved on the next day to fresh water, and camped on Trout Creek. Knowing that a party of men had left Denver a few days before we did, and feeling anxious to come up with them, the men shouldered their rifles and started out in search of footprints, each going in a different direction. The one who came upon the trail was to fire off his gun as a signal to the others. All day long I listened for the report of a gun. The men had not arrived when night's shadows gathered around, and I felt desolate indeed. The little jack came into the tent, and I bowed my head upon him and wept in loneliness of soul.

"The men had gone farther than they expected, and were somewhat bewildered, and only for the camp-fire that I kept blazing, they could not have found their way back.

"As they did not find the trail, we concluded to follow the way a stick might fall. It fell pointing southwest, and we went in that direction.

"Finding what we thought a good fording place in the Arkansas River, we decided to cross, as the road seemed better on the other side.

"The river was very rapid and full of bowlders, around which clung cakes of ice. Our cattle, thin, weak, and tired, were numb with cold, and halted in the middle of the river. The men plunged into the cold stream, which was waist deep, tied ropes to their horns, went upon the opposite shore, and endeavored to drag them over, but with no success. They then unloaded the wagon, putting the goods upon the ice, which was liable to break off and float away, unyoked the oxen, dragged the wagon over, and carried the goods on their shoulders. The faithful little jack swam the river with me on its back. Upon consulting our watch we found that we had been six hours crossing the Arkansas.

"We made a fire, dried our clothing on us, and nursed the cattle all night, feeling that we must save them, for our provision was getting low, and unless game came in from the valley, we should be obliged to eat them.

"After camping in this place a week, we moved further up the river, where we went to work in earnest. Mr. Tabor and Mr. Maxey whip-sawed some lumber and made sluice-boxes, sawed riffles from a log, put in a ditch from the creek, and commenced washing the bank away. Cleaning the boxes up at night, we found fine gold in an abundance of black sand. I worked hard every day, trying to separate the gold from the iron sand, and at night would have only a few pennyweights of the precious metal. For four weeks we worked there; our supplies were about gone, and we felt discouraged. It had been one long year since we heard from the loved ones at home.

"One morning a man came to the camp, and said he was one of the party that left Denver a few days in advance of us, and they had found gold in paying quantities. He gave us explicit directions how to reach the rich diggings. We followed his directions, and undertook to cross the river where it looked shallow. When near the opposite bank we came into a deep channel. Our wagon bed, with myself and child in it, raised above the wheels and floated down the stream. It was rapidly filling with water, when it occurred to me to cling to the willows on the bank. I did so, and held with unnatural strength until the men came to my rescue. We reached California Gulch three months after we left Denver. The first thing after camping was to have the faithful old oxen butchered that had brought us all the way from Kansas, — yes, from the Missouri River, three years before. We divided the beef with the miners, for they were without provisions or ammunition.

"Before night they built me a cabin of green pine logs, without floor, door, or window. The roof was covered with poles, bark, and dirt, and the wagon was converted into table, side-board, and three-legged stools. I entered this place happy that I once more had a roof to cover my head, and at once commenced taking boarders, with nothing to feed them except poor beef and dried apples.

"It was soon noised about that gold was struck in California Gulch, and before many weeks there were ten thousand people there. A mail and express was immediately decided upon, and I was appointed postmistress.

"With my many duties the days passed quickly. I was called upon to weigh all the gold taken from the upper part of the gulch,

as we were the only owners in that section of a pair of gold-scales. The miners would clean up their boxes, get their gold weighed, and go to town (where Leadville now stands), spree all night, and return 'dead broke' in the morning to commence again.

"Mr. Tabor was then working our mine, which was No. 12 above discovery. We took that because it had a fall; but it was a mistake, for the gold was nearly all washed over the fall into the claim below, from which eighty thousand dollars was taken out during the summer of 1860.

"I was very happy that summer, and joyfully anticipated a visit to my mother and father in the fall.

"On the 20th of September Mr. Tabor gave me one thousand dollars in dust. I put my wardrobe — what there was of it — in a carpet-bag, and took passage with a mule train that was going to the Missouri River. I was five weeks crossing, and cooked for my board.

"With that thousand dollars I purchased one hundred and sixty acres of land in Kansas, adjoining the tract we already owned. My folks dressed me up, and in the spring I bought a pair of mules and a wagon in St. Joe to return with, which took about all my money.

"Mr. Tabor gave me one-fifth of what was made that summer, when I left; the other four thousand he sent to Iowa and bought flour, and in the spring we opened a store in my cabin. He worked in the mine during the day, while I attended to the store. Those were days and years of self-sacrifice, hard labor, and rigid economy, when the foundation of Mr. Tabor's immense wealth was laid. A little less courage, fortitude, and perseverance would have turned us back, and the golden opportunity to amass a fortune been lost forever."

These hardships and perils are found no more in the New West. Where Mrs. Tabor drank deepest of the cup of bitterness, there are now thrifty and wealthy cities, with all the modern attractions of schools, churches, art, and adornment. Over the "Great Plains," where so many became the victims of starvation and the tomahawk, less than thirty-five years ago, the tourist rides in luxurious palace cars, with none to molest or make afraid.

Even now many of the New England people think of the New West as the place where "dug-outs," Indians, and buffalo predominate. But these are things of the past. We do not affirm that so-called "dug-outs" cannot be found anywhere in the New West; for that would not be true. But we affirm that where they were common twenty-five and thirty years ago, they exist now only in ruins. Buf-

falo are unknown to-day in the larger part of the New West. They have become almost extinct. And while Indians make occasional raids upon ranches and white settlements, in some parts of the West, that portion of the New West of which we have been speaking is not troubled by their presence. A New England lady went to Colorado to reside in 1877. At the end of four years she returned, on a visit, with her husband, and one day they were in the city of Boston, where they met on the street several Western Indians, whom a showman was exhibiting there. Turning to her husband, the lady re-

CROSSING THE PLAINS NOW.

marked, "Those are the first Indians I have seen since I left Massachusetts four years ago."

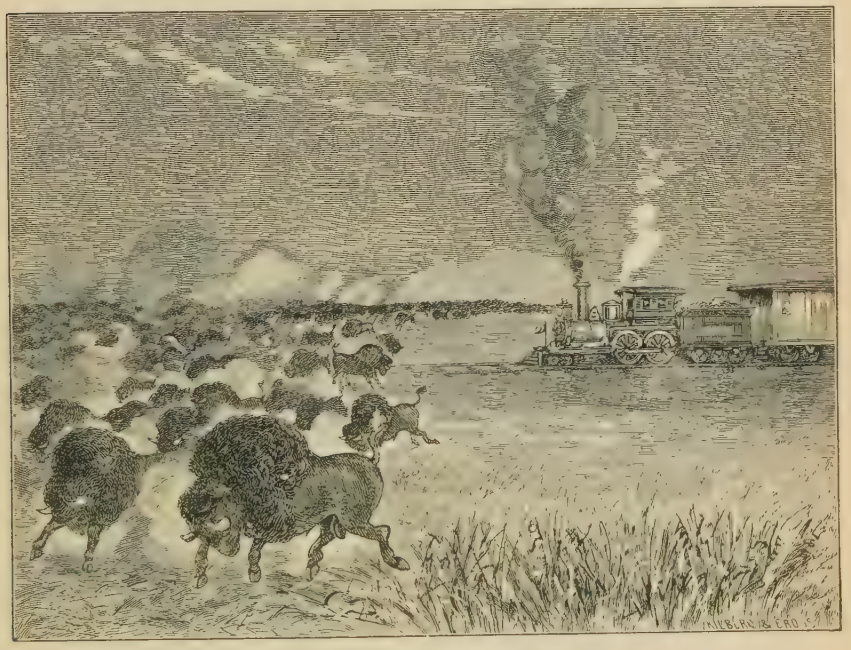
Fremont describes a herd of buffalo which he saw during one of his exploring expeditions, so large as to cover the country as far as he could see. By count he estimated that there were *eleven thousand* of them within a certain compass his eye took in; and this was only a part of the herd.

When the Union Pacific Railroad first went into operation, a train of cars was stopped quite a while by a herd of buffalo crossing the track. Colonel Dodge, in his "Plains of the Great West," speaks as follows of the buffalo: —

"Forty years ago the buffalo ranged from the plains of Texas to

beyond the British line; from the Missouri and upper Mississippi to the eastern slopes of the Rocky Mountains.

"In 1872, some enemy of the buffalo discovered that their hides could be sold in the market for a goodly sum. By wagon, on horseback, and afoot, the pelt hunters poured in, and soon the unfortunate buffalo was without a moment's peace or rest. Though hundreds of thousands of skins were sent to market, they scarcely indicated the slaughter. From want of skill in shooting, and want of knowledge in preserving the hides of those slain, on the part of these green



HERD OF BUFFALO STOPPING THE TRAIN.

hunters, one hide sent to market represented three, four, or even five dead buffalo. The hunter's object is not only to kill, but to avoid frightening the living. Keeping the wind, peeping over hills, crawling like a snake along the bottom of a ravine, he may approach unsuspected to within thirty or forty feet of the nearest. The game is so near that but one shot is necessary for each life. Hiding his every movement, the heavy rifle is brought to bear, and a bullet is sent into the heart of the nearest buffalo. The animal plunges forward, walks a few steps, and stops, with blood streaming from his nostrils. The other buffalo, startled at the report, rush together, but, neither see

ing nor smelling danger, stare in uneasy wonder. Attracted by the blood, they collect about the wounded buffalo. Again and again the rifle cracks. Buffalo after buffalo bleeds, totters, and falls. The survivors stare in imbecile amazement.

"I have myself counted one hundred and twelve carcasses inside of a semi-circle of two hundred yards radius, all of which were killed by one man from the same spot, and in less than three-quarters of an hour. The buffalo melted away like snow before a summer's sun. Congress talked of interfering, but only talked. Winter and summer, in season and out of season, the slaughter went on. In 1871–72, there was apparently no limit to the number of buffalo.

"As the game became scarcer, more attention was paid to all details, and in 1874, one hundred skins, delivered in the market, represented one hundred and twenty-five dead buffalo.

"To avoid overestimating, I have, in every case, taken the lowest figures, and the result is as follows: —

Killed by the Indians in the years 1872, 1873, and 1874	1,215,000
Killed by the Whites in the years 1872, 1873, and 1874	3,158,730
Total	4,373,730

Making the enormous, almost incredible number, of nearly four and a half millions of buffalo killed in the short space of three years. Nor is this all. No account has been taken of the immense number of buffalo killed by hunters who come into the range from New Mexico, Colorado, Texas, and the Indian Territory; of the numbers killed by the Utes, Bannocks, and other mountain tribes, in their fall hunt on the plains. Nothing has been said of the numbers sent from the Indian Territory, by other railroads than the Atchison, Topeka & Santa Fé, to St. Louis, Memphis, and elsewhere; of the immense number of robes which go to California, Montana, Idaho, and the Great West; nor of the still greater numbers taken each year from the territory of the United States by the Hudson Bay Company. All of these will add another million to the already almost incredible mortuary list of the nearly extinct buffalo."

On a former page we spoke of a stage line opened from Leavenworth, Kansas, to Pike's Peak, in May, 1859. In 1864 the Indians committed such depredations that the stage line was discontinued. Not only were wagon trains attacked by the savages, but stages were attacked also. Many wagon trains, containing supplies and machinery for traders and settlers, were captured and burned on the plains. Farmhouses and stage stations shared the same fate. Some stages were

captured and passengers massacred. Colonel Chivington's statement, already quoted, did not exaggerate the facts.

And this was little more than thirty years ago!

Even as recent as 1879, the author of "Camps in the Rockies" recorded an incident that shows how generally the perils from Indians pervaded the Rocky Mountain region. He says: "I visited the spot on two different occasions. The first time (in 1879) I reached the

STAGE ATTACKED BY INDIANS.

few scattered log-cabins, nestling under the beetling brows of a gorge, intersecting a vast upland plateau some six thousand or seven thousand feet above the sea; the inhabitants were in the throes of an Indian scare; the Utes had 'broken out' one hundred and fifty miles south, had massacred a lot of troops that had been sent to subdue them, and were now supposed to be on the war-path northwards, ready to do as a kindred tribe had done a year or two before; *i.e.*, to sweep the whole country and butcher the solitary white settlers. I happened to strike

the settlement a day or two after the first rumor of the Ute outbreak had reached it. Riding a few miles ahead of our men, who followed with the pack animals, I reached the cabin some hours before them. The men of the settlement were all away attending to a distant cattle-drive; they had left before the first alarm, and were not expected back for some days yet. The women — there were some eight or nine families — had, on receipt of the first warning, held a council of war, in which it was decided to retire to a small underground 'fort' — cellar would describe it better — connected by a subterranean passage with the largest log-cabin of the settlement. It was hastily provisioned; a woman who was in childbed brought hither, and everybody ready to repair to this last refuge at the first approach of the dreaded foe. My looks, as I rode up to the first shanty, I suppose, were not very reassuring. Long absence in the wilds of the mountains had reduced my dress to the last extremity. The skin and venison of a bighorn I had killed that morning were slung over my saddle, and festooned old Boreas's flanks, while my hands were still red with the blood of my game, as I had passed no water since my morning's kill. Altogether I must have looked, astride of my pony, who was likewise bespattered by blood, a somewhat uncanny character. Not having seen a white man for some time past, I was unaware of the Indian news, and hence was quite unprepared for the shout, 'Halt!' that stopped me a few yards from a fence surrounding the first log-cabin. On looking at the place from whence issued the voice, I espied a huge needle-rifle resting on the top bar of the fence. Its business end was pointed at me with unpleasant steadiness, while at the butt end I descried a diminutive bit of humanity in the shape of a boy of eleven or twelve.

"'Say, stranger, what the —— are you, anyhow? Be you a —— tarnal red-skin half-breed, or a white man?' demanded the miniature sentry, who, on the lookout for Indians, wanted to make sure ere he let me pass. My laughing answer was followed by his letting down the hammer of his rifle, and standing up under the shadow of his huge old arm, at least a foot and a half taller than himself, disclosing to me a bright-eyed youngster of frontier breed.

"'I am the boss of this yer camp,' he replied to my query, and taking from his trouser-pocket a roll of plug, he made a formidable bite at it. I had arranged to wait for my men at the settlement, so dismounting and tying up my horse, I followed his indication to go into the house, 'where mam oughter (ought to be) cooking dinner.'

"This latter personage, busy with her stove, seemed somewhat

taken aback when I stalked into the cabin. However, she seemed prepared for squalls; a well-filled cartridge-belt girthed her waist, a long six-shooter in its sheath being attached to it, while a Winchester rifle was leaning against the stove ready for immediate action. In ten minutes the loquacious Western lady had informed me of the state of things, — had told me in what a perpetual state of fright they had been the last two days; how every soul in the settlement retired every evening to their underground 'fort'; and how they longed to have their husbands and sons back again. She seemed delighted to hear that my party would presently follow, and that we had seen no signs of hostile Indians further north. After partaking of dinner, and the boy-sentry being relieved by a neighbor's daughter, I made the round of the cottages under the guidance of the boy-sentry, who turned out to be a very wide-awake little chap, a genuine Western-raised child, more of a man than many a swaggering lout double his age further east, his astonishing flow of bad language and the constant application to his plug being the only drawbacks to a more intimate acquaintance with him.

"I visited the cellar 'fort,' and comforted the sick woman with the news of the reinforcements the settlement had received. Some twelve feet square, with loop-holes where the walls, only seven feet high, joined the earthwork roof, it seemed a safe enough place, however insufficient in its dimensions, to hold twelve or fifteen human beings. The narrow passage, sloping upwards, some four or five yards long and only four feet high, connecting this cellar-like excavation with the body of the log shanty, was so arranged that it could be filled up with earth at a moment's notice, while the heavy pile of earth that covered the rafter roof, raising it slightly over the ground, made it difficult, if not impossible, for the Indians to fire the structure.

"My men arriving in due time, we pitched camp close to it, and remained there for two days, giving our worn-out cattle a very necessary rest. A part of the male contingent of the settlement returned before we left, and, as was not unnatural, felt very grateful to us for our presence."

Such an occurrence now is as improbable in Colorado as it is in Massachusetts. This fact alone shows the marvel of growth and improvement better than description.

The marvellous enterprise and growth of the New West is strikingly illustrated by the methods adopted to carry the mails. Gold was discovered in California in 1848, and in less than three years from that time there were one hundred and fifty thousand men in

San Francisco. They represented nearly the whole world; for they came from every quarter of the habitable globe, leaving loved ones behind.

To meet the necessities of so large a population, the mails became ponderous. They were conveyed by water from New York to San Francisco, each passage consuming from three to four weeks. Such delay was very trying to the feelings of those who were anxious to hear from friends at home, and extremely embarrassing to business

SNOW SKATES.

men. Yet, for ten years, all were forced to adapt themselves to these unfavorable circumstances.

The settlers in the rich valleys at the eastern base of the high Sierras of California were even worse off. Four or five months in the year no mails could reach them, on account of the depth of the snow. Fearless men attempted to scale the snow-crowned summits, again and again, to carry the mails to these inland-bound people, but as often sacrificed life to their temerity. It was trying enough to cross those mountains in summer time; but, in the winter, when

snow-storms raged almost daily, and the snow was often from fifteen to twenty feet deep, it was extremely perilous to make the attempt.

A Norwegian, however, by the name of John A. Thompson, proposed to carry the mail to these people through the winter, on snow-skates. His proposition was received with much incredulity at first, but he soon proved that he was in earnest and meant business. He had been trained from boyhood, in his native land, to the use of snow-skates.

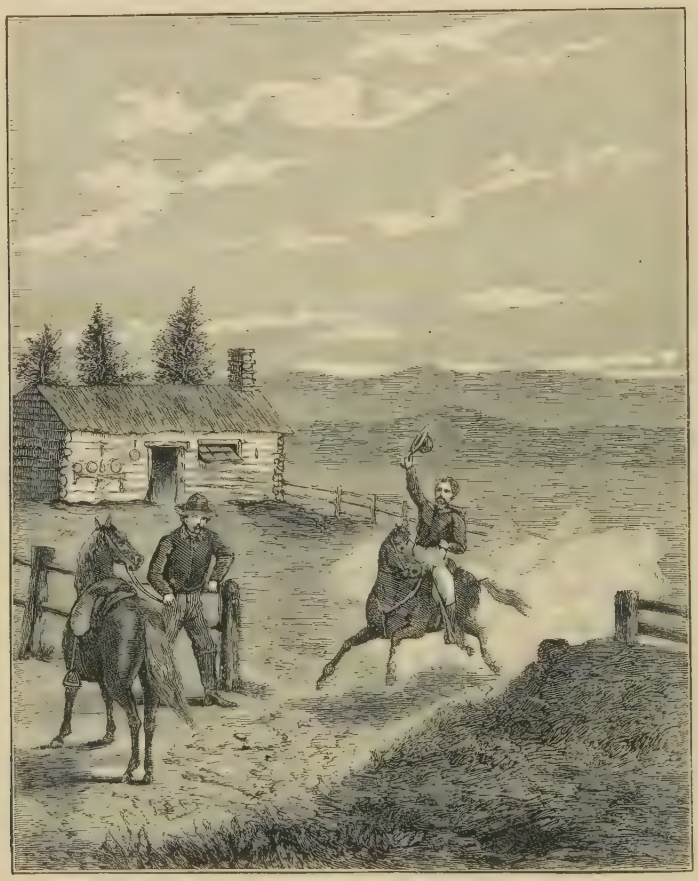
The reader will observe that the snow-*skate* is entirely different from the snow-*shoe*. The former is designed for skating upon hard snow, by which mode of travel, an expert, like Thompson, may acquire a speed not inferior to that in the skating-rink or on a lake of ice. The latter (the snow-shoe) is designed for walking on loose snow, in a level country, — a very slow process of locomotion. It is stepping instead of sliding.

In 1854, Mr. Thompson made a bargain with T. J. Matteson, of Murphey's Camp, Calaveras County, to continue postal service through the winter, on wages of two hundred dollars a month, no matter if the snow was twenty feet deep. From that time the settlement of which we are speaking enjoyed postal facilities in winter as well as summer; for Thompson made a success of his enterprise.

He carried a pole in his hand, which served as a brake on down grades, and a propeller up hill. On the whole, this method of carrying the mail was pleasurable as well as novel, contrasted with the more perilous method by horse and sleigh. In Sierra County, California, young people skate on snow instead of ice, on moonlight evenings, for pleasure and recreation. The sport is charged with excitement and fun. Young ladies challenge young men to a race of ten or fifteen miles on the snow-skate. That distance is readily accomplished in a winter evening.

No attempt was made to carry the mail overland to California until October, 1858, when the first mail across the continent reached San Francisco, Oct. 10. But in 1860, Majors, Russell & Co., of Leavenworth, Kan., established the famous "Pony Express." This was a plan to carry the mail on horseback at a rapid speed, changing horses at suitable distances, and drivers every fifty or seventy-five miles. The great object was to get letters through sooner. The first overland mail in 1858, was twenty-three days going through; and this was but little gain over the carriage by sea. The mail must be carried from the Atlantic to the Pacific in half that time, to answer the demands of business.

On April 3, 1860, the "Pony Express" left St. Joseph, Mo., and San Francisco simultaneously, and carried the mail through in ten days. The second trip consumed fourteen days; the third, nine days; the fourth, ten days; the fifth, nine days; and the sixth, nine; and this came to be about the average time consumed in conveying



PONY EXPRESS STATION.

the mail overland — a valuable saving of time to business men. The actual distance from St. Joseph to San Francisco, by the Pony Express route, was one thousand nine hundred and ninety-six miles.

The best of horses and the bravest of men were required for this service. For the breakneck speed required was too much for the stuff ordinary animals were made of, and the attacks of Indians and robbers demanded carriers who would fight or die. The sacrifice of

horse flesh and human lives was large. Tales of hardships and perils, stranger than fiction, could be written of this "Pony Express" enterprise. All weathers, through storm and sunshine, summer's heat and winter's cold, whether peace reigned or savages were on the war-path, by day and by night, over prairie and mountain, up hill and down, the mail-carrier must pursue his perilous way alone. A horse bridled and saddled awaited his coming at each station, and a fresh rider at stated intervals. No time should be lost. The mail must keep moving. As soon as one rider dashed up to his last station for rest, another, already mounted upon his fresh steed, seized the mail, and putting spurs to his horse, was soon out of sight.

PONY EXPRESS IN MOUNTAIN STORM.

The Pony Express was a genuine Yankee invention; and its remarkable success, in spite of the tremendous difficulties, caused the United States government to establish an overland mail route. This fact, together with the construction of the telegraph line, in 1862, caused the discontinuance of the Pony Express, — one of the most novel and exciting methods of doing business the world has ever known. Nor should it be forgotten that scarcely thirty-three years have elapsed since our national government attempted to carry the mail overland to California, and telegraphic connection between the extremes of the East and West was established.

The cut on p. 264 is an exact illustration of the first express line of Fargo and Wells over the Rocky Mountains. It was thought to be a remarkable triumph over difficulties at that time, and no one expected that the method would ever be superseded by anything

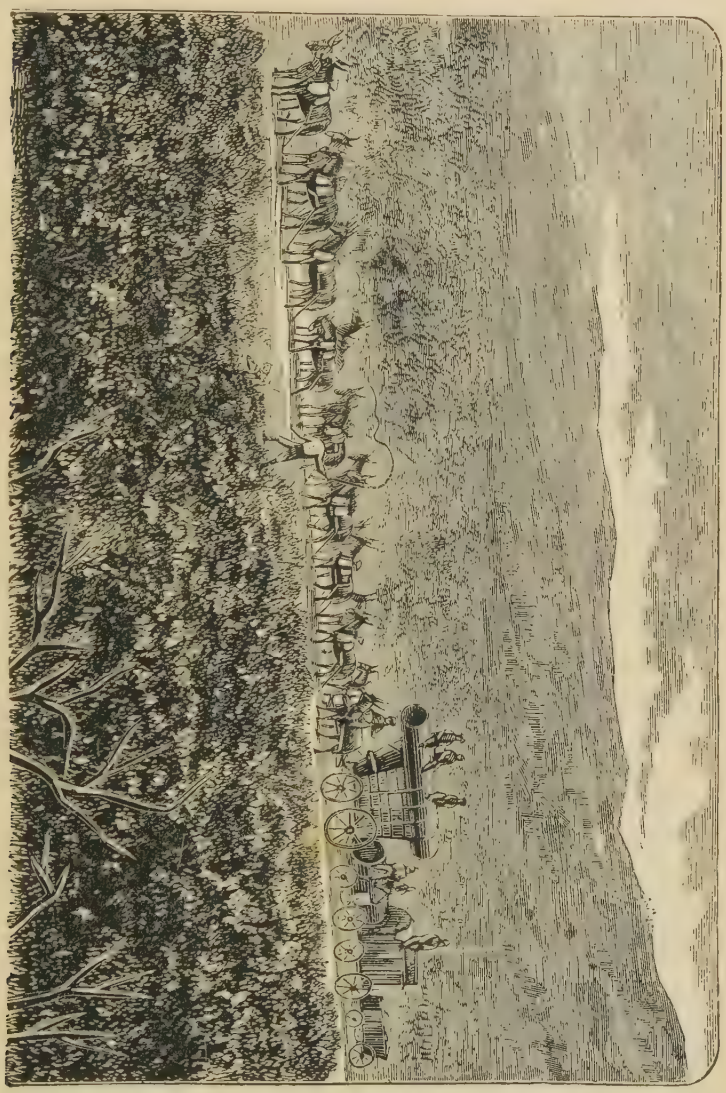
better. Yet a decade had scarcely passed away before the comfortable rail-car was rushing through these mountains on its way to the Pacific coast.

The growth of business, from the discovery of gold in Colorado, was surprising, even before the completion of the railroad to California. Mr. Crofutt furnishes figures from the books of freighting

FARGO AND WELLS EXPRESS.

firms in Atchison, Kan., and he says: "In 1865 this place was the principal point on the Missouri River, from which freight was forwarded to the Great West, including Colorado, Utah, Montana, etc. There were loaded at this place 4,480 wagons, drawn by 7,310 mules, and 29,720 oxen. To control and drive these trains, an army of 5,610 men was employed. The freight taken by these trains amounted to 27,000 tons. Add to these authenticated accounts the estimated business of the other shipping points, and the amount is

somewhat astounding. Competent authority estimated the amount of freights shipped during that season from Kansas City, Leavenworth, St. Joe, Omaha, and Plattsmouth, as being fully equal, if not



more than was shipped from Atchison, with a corresponding number of men, wagons, mules, and oxen. Assuming these estimates to be correct, we have this result: During 1865, there were employed in this business 8,960 wagons, 14,620 mules, 59,440 cattle, and 11,220

men, who moved to its destination 54,000 tons of freight. To accomplish this, the enormous sum of $7,289,300 was invested in teams and wagons alone."

Along the south bank of the Platte River, emigrant trains, with their white-covered wagons, together with immense freight-trains, rolled in almost one unbroken line. Sometimes these trains extended without a break as far as the eye could see, presenting a very novel and inspiring scene.

Many of the teams were a novel spectacle, on account of their length and the great loads carried. Mining tools and machinery and agricultural implements were all conveyed in this manner over the plains, before the railroad was constructed. We think, however, that no team was ever seen along the Platte so long and so heavily freighted as a mule team which carried boilers and machinery weighing fifty-four thousand pounds, from Elko to White Pine, in 1869. The illustration (p. 265) furnishes a good view of its magnitude.

Long since the emigrant trains disappeared from the south bank of the Platte, and the mule was exchanged for the iron horse. The railroad runs along the north bank of the river instead of the south, which is essentially forsaken.

UNION PACIFIC RAILWAY.

The construction of the Union Pacific Railroad across the continent was the greatest marvel of our age. The consummation of the enterprise settled the high destiny of the New West. From that moment old things began to pass away, and all things began to be new. Progress was wonderful; and now it sweeps onward more grandly than ever.

The precipitation of the war of the Rebellion, in 1861, turned the attention of Congress to a railroad across the continent. California was so widely separated from the other States of the Union, that Mexico, or some foreign power, might readily gain possession of it. It was well known to some of our public men that other powers were looking wistfully to our wealth on the Pacific coast. Under the impulse of this new development, Congress, in 1862, adopted measures for the construction of the Union Pacific Railway, and made July 1, 1876 (the nation's centennial year), the utmost limit of its completion. The first contract for the construction of the road was made in August, 1863, but months were consumed in harmonizing conflicting interests connected with the location of the road, so that ground was

not broken until the fifth day of November, 1865. The building of the road commenced at a point on the Missouri River, near Omaha, and at the close of January, 1866, forty miles of road had been constructed.

DRIVING THE LAST SPIKE.

Some enthusiastic friends of the road predicted, at the ceremony of breaking ground, Nov. 5, 1865, that the road would be completed in five years; and their prediction was recorded as the prophecy of

enthusiasts. The incredulous smiled, and opponents declared the prediction absurd. General Sherman was reported to have said, before work on the road commenced: "I should be unwilling to buy a ticket over it for my grandchildren." Five years thereafter he himself rode over it.

The road was completed in *three years, six months, and ten days.* Two hundred and sixty-five miles were built in 1866; two hundred and eighty-five in 1867; and the remainder finished May 10, 1869. Work on the road was commenced at both ends, and the two building parties met at Promontory Point, Utah Territory, on May 10, 1869, one thousand and eighty-four miles from Omaha, and eight hundred and thirty miles from San Francisco. Promontory Point is four thousand nine hundred and five feet above the sea.

That was a great day for our country and the world — DRIVING THE LAST SPIKE. A large concourse of people assembled, representing nearly every State of the Union, together with several foreign countries. They were largely public men, — men who fully appreciated the greatness and value of the work, — the completion of one thousand seven hundred and seventy-four miles of railway in one continuous line. The ceremony of laying the last rail, and connecting the two divisions was assigned to take place at twelve o'clock, noon. Mr. Crofutt says: —

"To give effect to the proceedings, arrangements had been made by which the large cities of the Union should be notified of the exact minute and second when the road should be finished. Telegraphic communications were organized with the principal cities of the East and West, and at the designated hour the lines were put in connection, and all other business suspended. In San Francisco the wires were connected with the fire-alarm in the tower, where the ponderous bell could spread the news over the city the instant the event occurred. Baltimore, Philadelphia, Boston, New York, Cincinnati, and Chicago were waiting for the moment to arrive when the chained lightning should be loosed, carrying the news of a great civil victory over the length and breadth of the land.

"The hour and minute designated arrived, and Leland Stanford, president, assisted by other officers of the Central Pacific, came forward; T. C. Durant, vice-president of the Union Pacific, assisted by General Dodge and others of the same company, met them at the end of the rail, where they reverently paused, while Rev. Dr. Todd, of Massachusetts, invoked the divine blessing. Then the last tie, a beautiful piece of workmanship, of California laurel, with silver plates

on which were suitable inscriptions, was put in place, and the last connecting rails were laid by parties from each company. The last spikes were then presented, one of gold from California, one of silver from Nevada, and one of gold, silver, and iron from Arizona. President Stanford then took the hammer, made of solid silver, — and to the handle of which were attached the telegraph wires, — and with the first tap on the head of the gold spike at twelve, noon, the news of the event was flashed over the continent. Speeches were made as each spike was driven, and when all was completed, cheer after cheer rent the air from the enthusiastic assemblage.

"Then the 'Jupiter,' a locomotive of the Central Pacific R.R. Co., and locomotive No. 116, of the Union Pacific R.R. Co., approached from each way, meeting on the dividing line, where they rubbed their brown noses together, while shaking hands, as illustrated on preceding page."

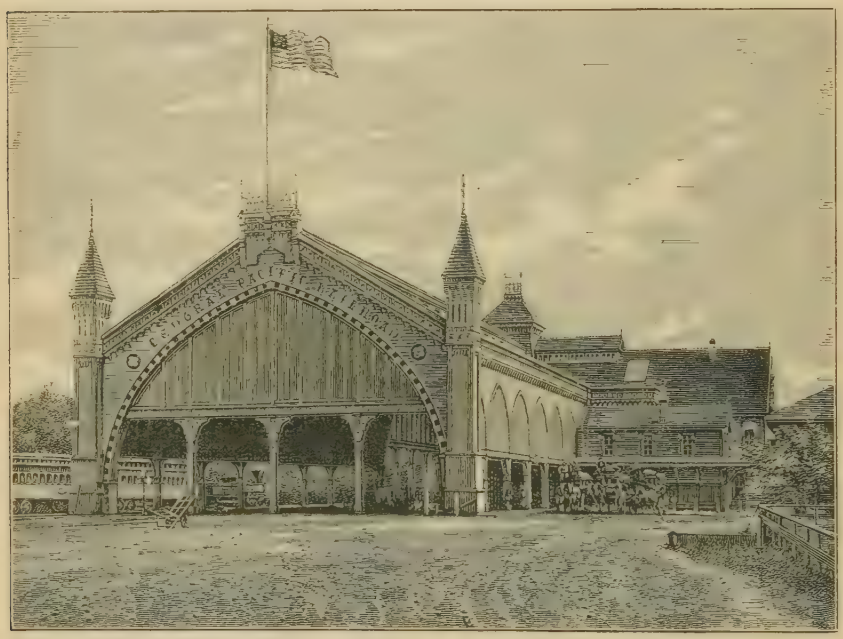
FIRST OFFICE.

The progress since that day is strikingly represented by contrasting the first and last depot of the Central Pacific Railroad. The first office of the railroad in Sacramento was a good match for their first depot. We can furnish a correct illustration of their first office, but not of their first depot.

The reader can readily imagine what the first depot must have been to match the above. The office was built in one afternoon, and cost $150. Probably the expense of the first depot was not whittled down quite so fine as that; but its appearance would excite a smile now in contrast with the last depot, which a writer describes as follows: —

"It is situated about midway between the bridge over the Sacramento River and the company's shops, fronts north, on ground filled in and specially prepared for that purpose. The main building is four hundred and sixteen feet long, and seventy feet six inches wide, two story. The front has four large arches in the centre, and eight

smaller ones on each side. Three tracks run through the building, and a platform twenty-two feet wide. In the rear is an annex, one hundred and sixty feet long, and thirty-five feet wide, one story, in which is a dining-room, forty by fifty-five feet, fourteen feet high; two waiting-rooms, twenty-six by thirty-five feet. On the first floor are ticket, sleeping-car, and telegraph offices, lunch-counter and baggage-room, news-room, etc. The second story is occupied by the offices of the Sacramento Valley Railroad, superintendent of division of the Central Pacific, train despatchers, conductors, rooms for storage, stationery, etc."



CENTRAL PACIFIC DEPOT.

The above is an excellent illustration of the spacious and costly depot.

We spoke of the commencement of the work near Omaha, Neb. Few persons appreciate the magnitude of the labor in such an enterprise. There was not a railroad within one hundred and fifty miles of Omaha when the ground was broken. Much of the material used in building the road was purchased at the East, and was transported by freight-teams over this one hundred and fifty miles; and laborers with their baggage were carried in the same way. The engine of seventy horse-power, which the company must have to drive their

works at Omaha, was carried in wagons from Des Moines, Iowa. There was great labor and expense involved in this transportation. Then there was no timber suitable for railroad purposes west of Omaha for five hundred miles. Indeed, there was little east of Omaha within five hundred miles. So that ties were purchased in Michigan, Pennsylvania, and New York, and shipped to Omaha, — one hundred and fifty miles of the distance. — in wagons. Each tie, delivered at Omaha, at that time, cost the company $2.50.

INDIANS' FIRST VIEW OF THE CARS.

The construction of the trans-continental railway proved a remarkable civilizer. Nothing did so much to put an end to Indian wars, and break up organized robbery throughout the New West, as connecting the East with the Pacific coast by rail. San Francisco was a month distant from New York by water, and two months by land; but now the two cities are only one week apart. Mails that carried to and brought from friends the news monthly, now accomplish the errand weekly. The hardships and perils of an overland journey to

the Pacific are exchanged for the ease and comfort of Pullman cars, which combine the accommodations of home and hotel quite largely.

Evidently, savage tribes regarded the invasion of the locomotive with its train of cars, as the daring assault of a foe more mysterious and powerful than any which had hitherto challenged their bravery. The shrill, piercing whistle of the engine, pouring a dense, black volume of smoke from its chimney, and the thunder of the train, played upon their superstitious souls, to fill them with alarm and apprehension. It seemed to them that, for some unknown reason, the Great Spirit had resolved to destroy their hunting-grounds and homes in the wilderness. The locomotive was to them a monster "*fire-wagon*," and the train of cars, "*heap wagon, no hoss.*" The whole thing was mysterious and wonderful to them. They could not comprehend the strange spectacle. At first they viewed the cars from the hill-tops at a distance, not daring to come within cannon-range of them.

In time the redskins grew bolder, and, it is claimed, attacked a "fire-wagon," for the purpose of capturing it; but they were so seriously discomfited that they concluded "*fire-wagon bad medicine.*" Mr. Hayes, in his "New Colorado, etc.," says: "The graders and track-layers often had to fight their way, and there is a tradition current of an attempt to stop an express train. It is understood that a lariat was stretched across the track, breast high, and held by some thirty braves on each side; but, says the narrator: 'when the engineer fust see it, he didn't know what on airth wuz the matter; but in a minute more he bust out laughin', and he ketched hold of that throttle, an' he opened her out; an' he struck that there lariat agoin' about forty mile an hour, an' he jest piled them braves up everlastin' permiscuous, *you bet!*'"

The famous war-chief Mi-ra-ha, of Arizona, hearing of the mighty "fire-wagons," gathered a party of Apache Mohaves, and went on a journey of several hundred miles to see the "terrible" machine.

There are many interesting facts and incidents connected with the building of the Union Pacific Railroad worthy of a record here. The whole cost of the road from Omaha to the Pacific coast is estimated to be $186,498,900. It is not claimed that these figures are exact, but they express the approximate cost of the work. There were used in the construction of the road about 900,000 tons of iron rails, 1,700,000 fish-plates, 6,800,000 bolts, 6,126,375 cross-ties, and 23,505,500 spikes.

Four miles west of Promontory Point is a sign-board, on which is inscribed, —

"TEN MILES OF TRACK IN ONE DAY."

Ten miles further west is another board bearing the same inscription, and the explanation to this, — the track between those two sign-boards was laid in one day, — more track than was ever laid in a day before or since. The cause of this extra effort was the rivalry created between the Central working-gang west of Promontory and the Union working-force east of that point. The Central gang boasted that they could lay more track in a day than the Union. The Union track-layers accepted the challenge, and laid six miles in one day. Then the Central workmen laid seven, to which the Union men responded by laying seven and a half miles. Then the Central gang announced that they would lay ten miles of track in one day, which the officers of the Union declared could not be done, Vice-President Durant offering to bet $10,000 that it could not be done. The Central men proposed to establish their claim on the twenty-ninth day of April, when there was only fourteen miles of track to be laid, to connect with the Union at Promontory Point. Every necessary arrangement was made, and on the appointed day, in the presence of the officers of the road and a committee from the Union, the work was accomplished.

Mr. Crofutt describes the manner of doing the work as follows: "When the car loaded with rails came to the end of the track, the two centre rails on either side were seized with iron nippers, hauled forward off the car, and laid on the ties by four men who attended exclusively to this. Over these rails the car was pushed forward, and the process repeated. Behind these men came a gang of men who half drove the spikes and screwed on the fish-plates. At a short interval behind these came a gang of Chinamen, who drove home the spikes already inserted and added the rest. Behind these came a second squad of Chinamen, two deep on each side of the track. The inner men had shovels, the outer ones picks. Together they ballasted the track. The average rate of speed at which all these processes were carried on was one minute and forty-seven and one-half seconds to every two hundred and forty feet of track laid down. Those unacquainted with the enormous amount of material required to build ten miles of railroad can learn something from the following figures: It requires 25,800 cross-ties, 3,520 iron rails, 55,000 spikes, 7,040 fish-plates, and 14,080 bolts, the whole weighing 4,362,000 pounds. This material is required for a *single* track, exclusive of 'turnouts.'

"To bring this material forward and place it in position, over

4,000 men and hundreds of cars and wagons were employed. The discipline acquired in the four years since the commencement of the road enabled the force to begin at the usual time in the morning, calm and unexcited, and march steadily on to 'Victory,' as the place where they rested at 1.30 P. M. was called, having laid *eight miles of track in six hours*. Here this great 'Central' army must be fed, but Campbell was equal to the requirements. The camp and water train was brought up at the proper moment, and the whole force took dinner, including many distinguished guests. After the '*hour noning*' the army was again on the march, and at precisely 7 P. M. *ten miles and two hundred feet had been completed.*

"When this was done, the 'Union' committee expressed their satisfaction and returned to their camp, and Campbell sprang upon the engine and ran it over the ten miles of track in *forty minutes*, thus demonstrating that the work was *well done*."

Our national government has been severely criticised by many of its subjects for the liberal aid it rendered to the enterprise. First, government granted to the railroad company "every alternate section of land for twenty miles, on each side of the road," which would be twenty sections, or 12,800 acres for each mile of the road. The aggregate in acres for the whole road from Omaha to Sacramento, the terminus of the road when it was first built, was 23,735,104 acres. Government agreed also to issue its thirty-year six per cent bonds in aid of the work as follows: for the least expensive portion of the road over the plains, $16,000 per mile; the next most difficult portion, $32,000 per mile; and for the mountainous district, $48,000 per mile. These pledges of the government footed up $51,121,632.

In the commencement of the work, fault-finders appeared in almost every grade of society. Statesmen and laymen alike charged Congress with "extravagance," "unwisdom," "fooling away the nation's land and money." Multitudes of the "common people" accepted the criticisms of the more public men, and seemed to take it for granted that government had acted without reason in the affair. Thus men fretted, grumbled, and bandied hard epithets while the work went bravely on. But long since, most of them, seeing their folly, abandoned their opposition, until now the dissatisfaction is confined chiefly to those who can see no connection between a loyal public spirit and national prosperity, — ignorant, unpatriotic men. The people understand now, that but for the Union Pacific Railroad, the government lands over much of the way, would be comparatively valueless. They were so before there was a prospect

of the railroad being built. But on the day of *driving the last spike* they were lifted into market value; and from that day to this there has been a constantly increasing demand for them *at twice their former value*. The best bargain the United States government ever made was when it contributed twenty-three million acres of land and fifty millions of bonds, to aid in constructing this road to the Pacific; unless, possibly, we except its bargain, when, through President Jefferson, it purchased the "Louisiana Province" of the French government for about two cents an acre.

The intelligent citizens of our country to-day appreciate the remarks of Senator Wilson of Massachusetts, afterwards Vice-President of the United States, who said, in the Thirty-Seventh Congress, when this project was under discussion: —

"I give no grudging vote in giving away either money or land. I would sink $100,000,000 to build the road, and do it most cheerfully, and think I had done a great thing for my country. What are $75,000,000 or $100,000,000 in opening a railroad across the central regions of this continent, that shall connect the people of the Atlantic and Pacific, and bind us together? Nothing. As to the lands, I don't grudge them."

After the road had been completed two years, Senator Stewart, from the Committee on the Pacific Railroad, said in his report to the United States Senate: —

"The cost of the overland service for the whole period — from the acquisition of our Pacific coast possessions down to the completion of the Pacific railroad — was over $8,000,000 per annum, and this cost was constantly increasing.

"The cost, since the completion of the road, is the annual interest [which includes all the branches — Ed.] — $3,897,129, — to which must be added one-half the charges for services performed by the company, about $1,163,138 per annum, making a total expenditure of about $5,000,000, and showing a saving of at least $3,000,000 per annum.

"This calculation is upon the basis that none of the interest will ever be repaid to the United States, except what is paid by the services, and that the excess of interest advanced over freights is a total loss.

"In this statement no account is made of the constant destruction of life and private property by Indians; of the large amounts of money paid by the secretary of the treasury as indemnity for damages by Indians to property in the government service on the plains,

under the act of March 3, 1849; of the increased mail facilities; of the prevention of Indian wars; of the increased value of public lands; of the development of the coal and iron mines of Wyoming, and the gold and silver mines of Nevada and Utah; of the value of the road in a commercial point of view, in utilizing the interior of the continent and in facilitating trade and commerce with the Pacific coast and Asia; and, above all, in cementing the Union and furnishing security in the event of foreign wars."

According to Senator Stewart, the government saves three million dollars annually by the operation of this railroad, so that the saving of seventeen years will cover the bonds which it pledged. And if the gift of twenty-three million acres of land made salable as many more acres and doubled the price, surely no one has any reason to criticise the government for the bargain.

POPULATION.

Another item should be recorded here, as showing the marvellous growth of the West. In 1860, the States and Territories on the line of the Union Pacific Railway, and immediately contiguous, embraced a population of only 554,301, with thirty-two miles of railway, and 232 miles of telegraph. In 1870 (the expiration of the ten years in which the Pacific road was planned and built), the population had increased to 1,011,971, with 4,191 miles of railway, and 13,000 miles of telegraph completed, and hundreds of miles more in progress. The investment of capital, too, had grown to be enormous, amounting to $363,750,000, without including investments in mining, cattle-raising, agriculture, and other industries. To represent the almost incredible growth down to the present time, we must treble, if not quadruple, the aforesaid figures.

The rapid advance of the population of the New West is phenomenal. Nevada's gain was the smallest, and yet Nevada's gain from 1870 to 1880 was fifty per cent. In the same period, California and Idaho gained sixty per cent; Oregon, one hundred per cent; Utah, one hundred and fifty per cent; Kansas, two hundred per cent; Wyoming two hundred and fifty per cent; Nebraska and Washington Territory, three hundred per cent; Colorado, four hundred per cent; Arizona, four hundred and fifty per cent; and Dakota, nine hundred per cent. That portion of our country which liés west of the Mississippi added FOUR MILLION to its population in ten years. The reader can make his own estimate as to the time, near at hand, when the

population of our country west of the Mississippi will be greater than its population east of it. For, "westward the star of empire takes its way" at the rate of *fifty feet* every twenty-four hours, or *three and one-half miles* each year.

There are more inhabitants and wealth west of the Mississippi River to-day than there were east of it fifty years ago. In 1820, Ohio was a wilderness, resounding with the stroke of the pioneer's axe; but now the centre of the population of the United States is on its western border. Fifty years from now, its centre of population will be, doubtless, not far this side of the Mississippi River. And, more than to any other enterprise, the country is indebted to the construction of the Union Pacific Railroad for this growth.

The State of Nebraska, so recently on the frontier of the "Far West" is now quite central. When the city of Washington became the national capital, it was too far west to suit many Eastern people. It is now altogether one side, as the geography of the country proves, and much too far east to suit the inhabitants of the New West.

The completion of the Union Pacific Railroad put an end to high prices. During the winter of 1865–66, the garrison at Fort Sedgwick, and the inhabitants of Julesburg, Nebraska, paid one hundred and five dollars per cord for wood, which was the price the government paid by contract. The wood was purchased in Denver at a cost of about twenty dollars per cord, and the actual cost of hauling it to Julesburg was from sixty dollars to seventy-five dollars per cord. The government allowed contractors to put in what hard wood they could get at double price, — two hundred and ten dollars per cord. Contractors ceased to "feather their own nests," when the thunder of the train broke the silence of prairie and mountain.

Let the reader return now to the hardships, perils, and sufferings which made the New West a place of terror to multitudes a single generation ago, that by contrast he may appreciate the almost incredible achievements of enterprise, in building railroads through a wild mountainous country, where so recently explorers starved and died in a vain search for a way to the Pacific Slope.

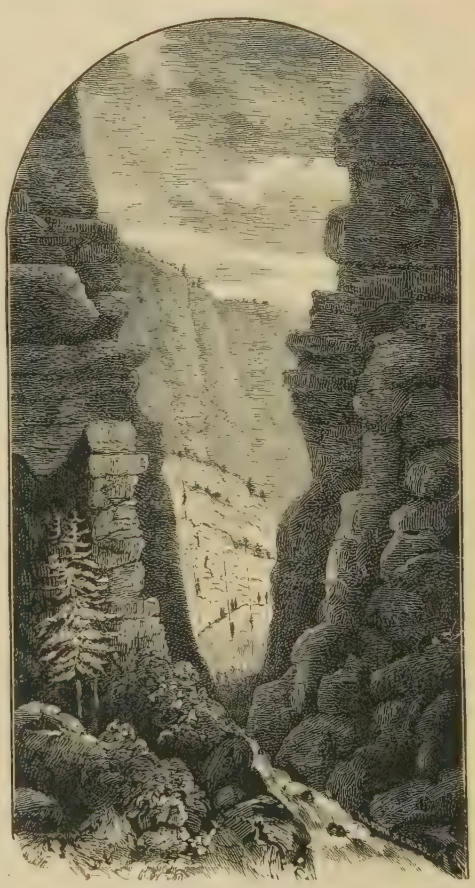
RAILROADS OVER MOUNTAINS.

In no way can we exhibit the marvel of enterprise to such advantage as by a description of railways through the deepest cañons and over the highest mountains. The prediction, fifty years ago, that the time would come when pleasure-seekers would travel in Pullman cars,

where then explorers died of hunger, would have been received with derisive laughter. Yet this strange experience has been realized.

We have already spoken of the Arkansas Cañon as a physical wonder; it remains to show how human enterprise has converted it into a public thoroughfare, marvellous both in its conception and execution.

It is not known that man or beast ever passed through this remarkable gorge until the year 1870. When the project of constructing a railway through it was first made public, it was received with doubt and ridicule. Engineers said, "The thing is impossible." After elaborate examination, however, and long, thoughtful research and study, an engineer, in whose dictionary the word "impossible" was never put, was found willing and anxious to undertake the work. Under his skilful management, the railway was built, and a new and scarcely dreamed of pleasure offered to the public.



LOCATING THE LINE.

It was necessary to begin the work of constructing the railway several hundred feet above the river, splitting the granite walls downward Workmen were suspended from the edge of the cañon above by ropes, and lowered to the spot where operations must commence, as seen in the illustration. There they hung, midway between the opening above and the bed of the river, until a foothold was secured by drilling and splitting. The obstacles and perils attending such a remarkable enterprise cannot be overestimated. The engineer, with faith and courage enough to undertake a work of such magnitude, must be accorded a high place among the world's benefactors. But

all difficulties were overcome by patience and perseverance, and the marvellous work was accomplished without an accident. The ten miles of railway through this cañon cost $1,400,000 (one million four hundred thousand dollars), or one hundred and forty thousand dollars per mile.

The walls of the cañon, two thousand feet high, approach nearest to each other at the "Royal Gorge," where they are not more than thirty feet apart. Here the passage is too narrow for both river and railway, so a bridge is suspended over the chasm by rods, over which the railway train passes on its way.[1] The scene is totally unlike anything the traveller has witnessed before. It is awe-inspiring and even fearful. There were from sixty to seventy passengers on the train when the author passed through the cañon in an observation-car. Not a word was spoken. No merriment was noticeable. Silent, serious thoughtfulness marked every countenance. Several passengers unconsciously rose to their feet and uncovered their heads, as if in the immediate presence of the Author of all this grandeur. A woman directly in front of the writer bowed her head and wept. A score of others showed their honest sympathy with her by their irrepressible emotion, as unbidden tears bedimmed their vision.

The scene and the occasion of the first railway excursion through this cañon was graphically described by the Denver *Tribune* as follows: —

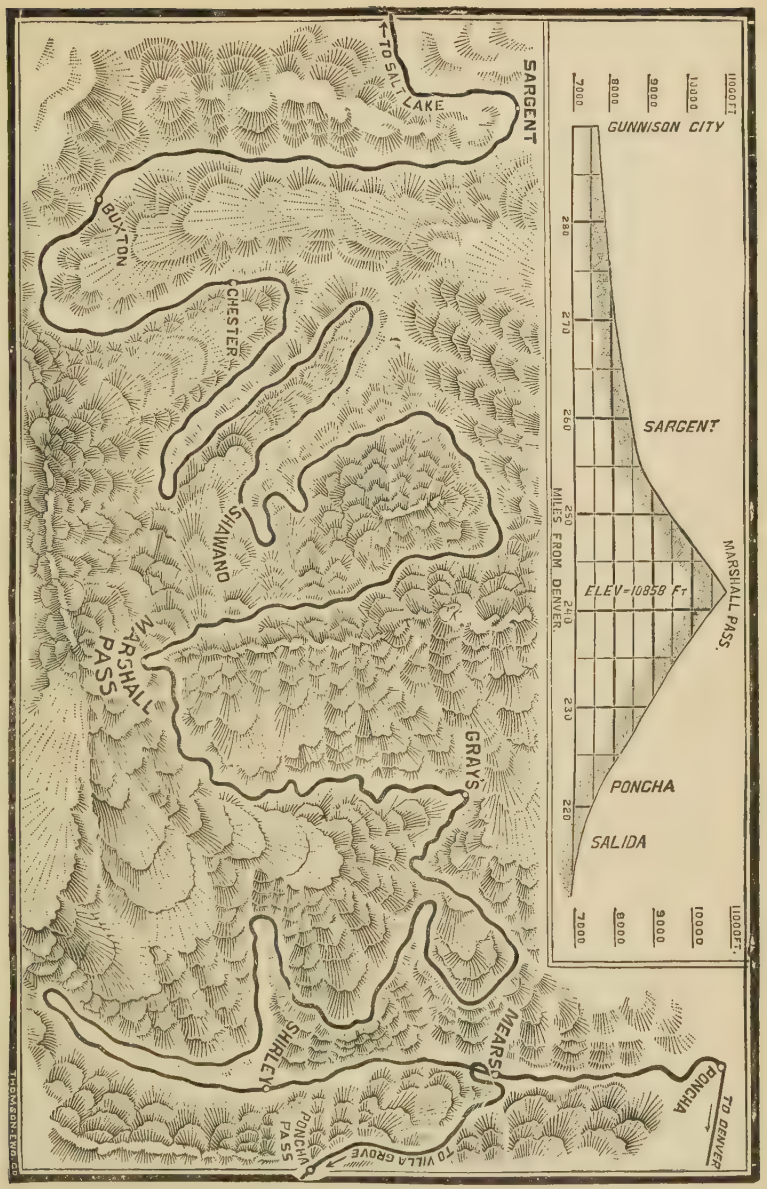
"The most stupendous achievement of railway engineering over Nature's efforts to obstruct the pathway of commerce, was triumphantly achieved on the 7th of May, 1879, by the Atchison, Topeka and Santa Fé Railway Company, which on that day made the passage of the Grand Cañon of the Arkansas, with a train of cars carrying an excursion party of ladies and gentlemen, numbering over two hundred persons. This rock-bound river pathway became known to Spanish missionaries as early as the year 1642. From that time it was not known that any animal life had ever passed through it successfully until the winter of 1870. The approach to the Cañon is gradual. The distant hills draw nearer, and the valley of the Arkansas becomes narrower and narrower, until the river is shut in closely on both sides by high mountains, sloping gently away and covered with verdure. Then the slope of the mountains becomes more perpendicular, and the hills become higher, until suddenly the river is completely shut in by mountains with mighty tops. The roar and rattle of the train grows louder and echoes up and down. The train

[1] See page 5.

is fairly in the cañon. It moves slowly. The mountain walls are of a dizzy height, and so close together that, looking ahead, they appear simply to form a crevice, a huge, awful, crooked crevice, through which the miserable little train is timidly crawling. The curves of the cañon are superb. They constitute the finishing touch to its grandeur, and fill the mind with a full appreciation of this great miracle of nature. But the Royal Gorge! Imagine two almost perfectly perpendicular walls rising to the height of two thousand feet, those walls presenting jagged and irregular masses of rock that on the railroad side hang over the train all creviced and ready to fall in thousands of tons. The road-bed is cut out of the solid rock, and masses of this hang over it, stretching out a hundred feet. One cannot look up to the top of this wall on account of those projecting, irregular bluffs, but the height to the top, even as measured by the eye, disturbs the faculties and brings on vertigo. The cooped-up Arkansas rushes madly by, a narrow thread, made still more so by the rocks thrown into it. There is not room to step from the train without pitching into the river. Not a word is uttered. The engineer whistles occasionally, and timid folks look for the rocks to fall. It is really a strain on the mind to take it in; and this can be only feebly done on a single trip. Two thousand feet above you are the tops of the mountain walls. You are imprisoned in a crack thirty feet wide, and are partially under one mountain wall. You can see on the opposite side the gradations of the verdure, rich below, impoverished above. And the curves become more awful as you look ahead or back.

"There was no sun in the Gorge, but it slanted down the opposite mountain wall as the party returned through the cañon, increasing the surpassing beauty of the scene."

Leaving the Arkansas Cañon, and traversing the upper Arkansas Valley, as lovely as it is narrow, the train begins to scale the heights of Marshall Pass. The serrated peaks of the Sangre de Cristo are in full view at the west, and the scene is indescribably grand. Two ponderous engines puff and tug upward with their train of human freight. Looking far away towards the summit, a narrow rim or line is seen. "That is the track over which we are to pass to the summit," said the conductor. Winding around the mountains, through the deep, wild ravines, ascending from one hundred and fifty to two hundred and ten feet to the mile, in one hour the train triumphantly gains the summit, ten thousand seven hundred and sixty feet above the sea. Such a panorama here opens to the view! The Sangre de



ALIGNMENT OF THE D. & R. G. RAILROAD OVER MARSHALL PASS, COLORADO.

The above cut shows the marvellous railroading over Marshall Pass. The Pass is entered almost imperceptibly from Poncha Pass, and the whole wonderful ascent might very readily be imagined as one and the same. The summit is almost eleven thousand feet above the sea, and the tortuous method by which the daring engineers of the Denver and Rio Grande Railroad have achieved this summit can best be understood by studying this cut, which illustrates the alignment of the track.

MARSHALL PASS.
On Line of D. & R. G. Railway.

Cristo Range looms up in the distance, wearing a crown of snow that glistens in the distance, while the great San Luis Park, larger than the State of Connecticut, stretches out at its base. Westward the mountain peaks are less towering, but the scene is no less inspiring.

Looking down into the Tomichi Valley, two thousand feet, perhaps, the railway track is seen doubling back and forth in its zigzag course to Gunnison City. The vision is unobstructed, and the traveller begins to comprehend what a joy it is to stand upon the "Continental Divide," and "survey creation round." How is it possible for the railroad train to reach the valley below in safety, turning sharp curves, rounding abrupt headlands, and gliding along the verge of awful precipices? But it does; and when the delighted passenger looks backward and upward from the valley to the cold, bleak, bewildering height from which he has descended, he wonders still more how it was done.

This route is embraced in what the managers of the Rio Grande Railway denominate "The Scenic Route"; and truly it is all of that. Any railway crossing the Rocky Mountains or the Sierra Nevadas must necessarily take a route that is "scenic." Grand and beautiful scenery exists in profusion everywhere. Rising from extended "plains" into mountainous regions, through cañons whose mighty walls on either side tower two thousand feet towards the sky, with here and there a pinnacle hundreds of feet higher, peaks of different shape and size piled one above another, cliff on cliff ascending to dizzy heights, rushing torrents far, far below the track, and silvery cascades leaping from dizzy summits, with here and there a park or lake stretching out for miles its fruitful acres or silver sheen, eight thousand feet above the sea, — such a route possesses enough of the grand, beautiful, and sublime to challenge the appellation, "scenic."

A description of a trip through Platte Cañon will still further exhibit the marvels of railroad enterprise in the New West.

Twenty miles from Denver the train entered the cañon upon a shelf so narrow as to suggest the thought that railroad builders were willing to accept the smallest favor from the contesting Platte torrent. Once within the cañon, the train began to ascend the steep grade, winding its serpentine way under the shadow of overhanging rocks and frowning cliffs, round and round, higher and higher, up, up, up, often rising two hundred feet to the mile, with castellated walls towering a thousand feet above, and here and there a mountain-peak shooting two or three thousand feet into the air, presenting a scene of grandeur and sublimity that baffles description. We were filled with surprise and wonder. Every curve disclosed new glories; every mile bore witness to the indomitable perseverance and tact of man.

The "tug of war" to the locomotives was on the home stretch

between Webster and Kenosha Divide, which is 10,139 feet above the sea. The ascent is steep and perilous, and the railway track doubles back and forth upon itself several times in order to scale the heights. It is two miles to the summit; but that point cannot be reached without winding about, going eight or ten miles to ascend two. At a point near Webster, the conductor requested the passengers to look down into the valley from whence they had come. The descent to the valley was almost perpendicular, and the distance from fifteen hundred to two thousand feet. Obeying the request, we looked down, and lo! there nestled in the valley the neat little village we had left some time before directly under us, the houses appearing no larger than hen-coops, and a horse and cart on the street resembling a child's toy horse and cart. A sense of danger came over us as we gazed for a moment and then turned away from a marvel that one does not care to view too long.

HEAD OF SOUTH PARK.

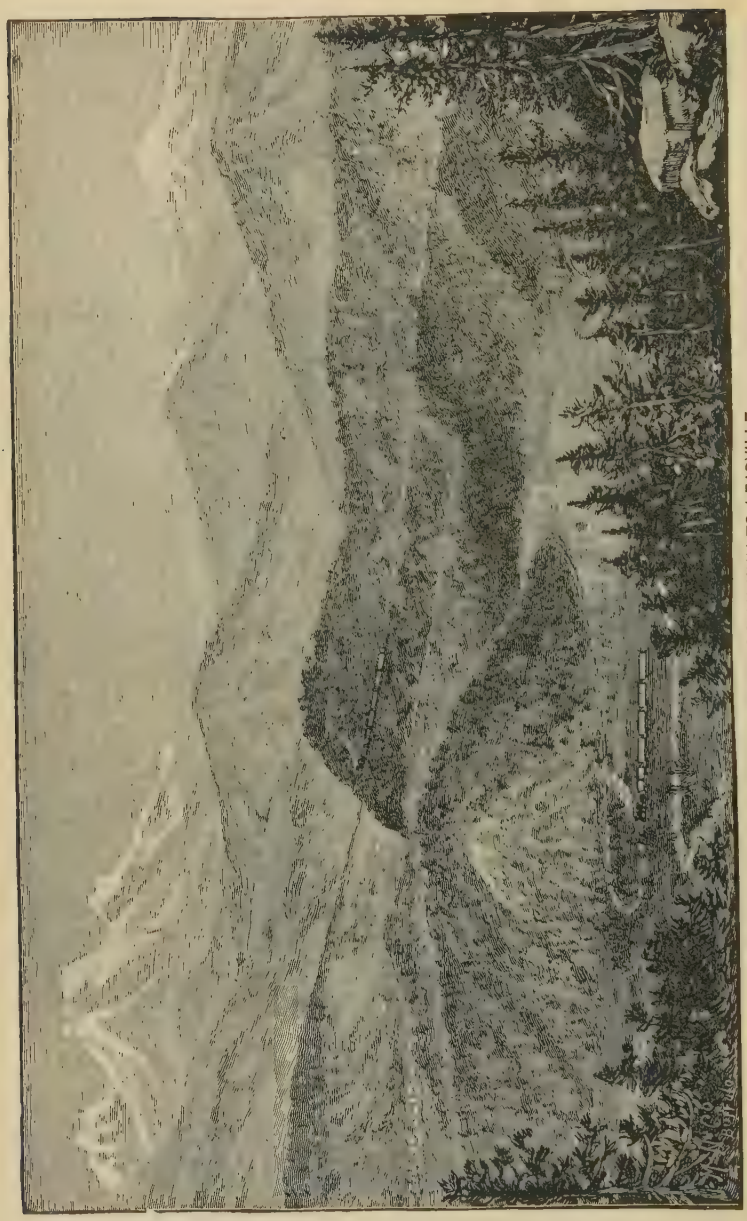
From Kenosha Divide the train descended into South Park, introducing the sight-seer to a spectacle for which he is wholly unprepared, — a park level as a house floor, containing two thousand two hundred square miles, nine thousand five hundred feet above the level of the sea, and completely walled with mountain peaks, covered with perpetual snow. The illustration furnishes the curve of the railway at the head of the park, with a view of the enormous plain and the tall snowy range.

Before the time of railroads, a line of stages passed along the northerly rim of the park, over Mosquito Pass, which is twelve thousand feet above the sea. This was the highest stage line in the world.

Some of the heaviest railroad work and most remarkable scenery of the New West are found between South Park and Leadville by the way of Breckinridge. An observer describes the scenic features of the route so vividly, that we quote him in full. "From Como, with the first revolution of the wheels, the climb for the crest between two oceans begins. Ahead are the hills, snow-crowned; behind, the Park where a hundred shades blend in a picture vast and rare. In the first gulch traversed, miners are washing gold. Towns and

STAGE LINE OVER MOSQUITO PASS.

ranches dot the receding levels. Unexpected tints develop with every foot of progress. The feelings of the moment admit of no record. As timber line is approached there is something awful in the grandeur. The mountains tower lifeless and sombre. Even the trees are dead and standing gaunt and fire scarred. Far below a stream crooks itself along the valley. At Boreas, 11,496 feet above the sea, the summit is reached. From this point the view is sublime and full of warmth. The trees are dense and luxuriant. Their piney odor fills the summer air. Ten Mile range rises in the near distance,



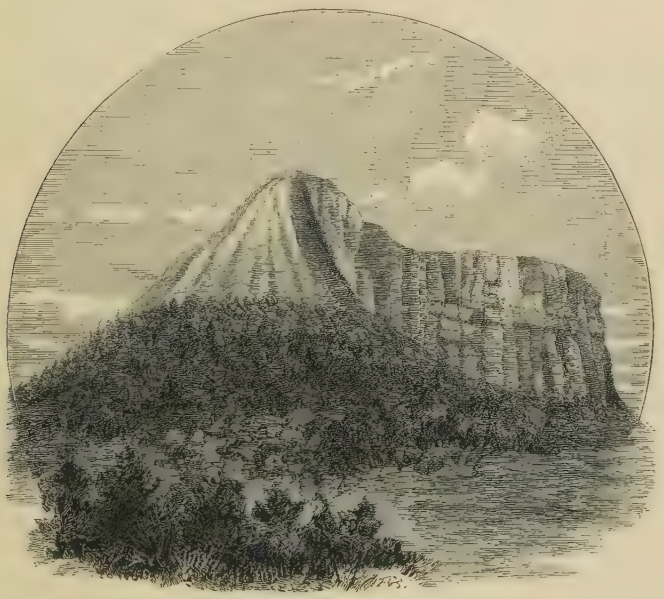
NEAR BRECKINRIDGE ON WAY TO LEADVILLE.
On the Line of U. P. Railroad.

ponderous and pure under its snow. You are looking down the valley of the Blue, by many considered the loveliest encompassed by the Rockies. Over it is a blue-gray mist like a veil, that parts at the touch of the sun. Mines in every direction place romance and reality

hand in hand. The Atlantic Slope fades from sight. An old Ute trail can just be discerned on the banks of the stream, lost now and again in the trees. Pacific Peak frowns down snowily, heedless that summer winds are playing about its base. It is full of silver and gold, and men are delving for it."

The illustration affords the reader a fine view of the railway in its upward course to the mountain summit, winding about among the peaks, which are marvellous in size and numbers, until the laboring locomotive halts like a conqueror upon the crest.

The writer quoted speaks of "timber line." "Timber line" is the



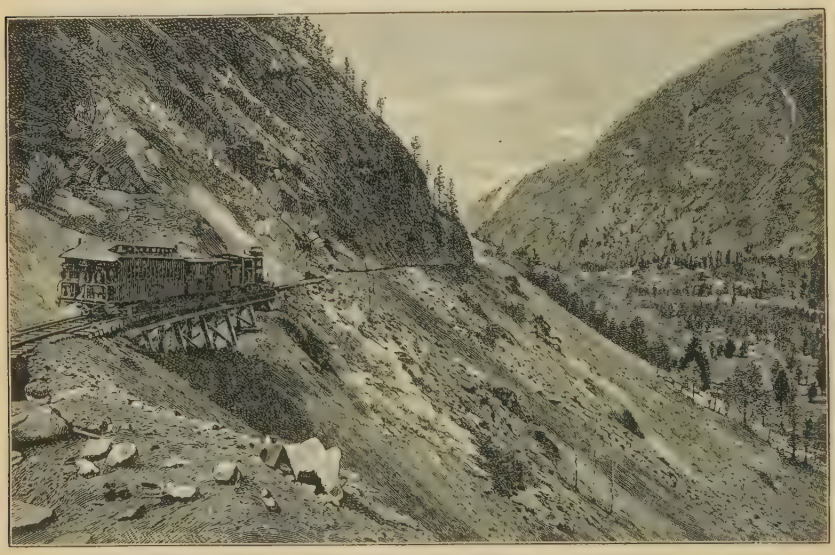
ABOVE TIMBER LINE.

altitude above which vegetation ceases. The altitude varies from 10,500 to 11,500 feet, and is too bleak and cold for tree or shrub to live. Barrenness and desolation, or perpetual snow, meet the eye above the altitude named. Our illustration shows very clearly what "timber line" is.

The "Alpine Tunnel" is reached through "Chalk Creek Cañon," — a ride of wonderful interest. Some tourists have declared that this ride cannot be duplicated in the whole world; that neither writer nor painter can do justice to the attractions. From personal observation we affirm that some of the wildest scenery which we saw in the Rocky Mountains was seen here. In some localities it ceased to

be grand and became awful. The thought of penetrating such an "abyss of desolation" in a Pullman car would have seemed absurd but for the fact that ours was doing that very thing. A photographic view in this cañon, at an interesting point, will give a good idea of the wild, rough, and desolate appearance of the gorge.

We remember with peculiar interest a descent into a narrow valley, where, in order to ascend the mountains on the opposite side, the railway made a detour of several miles, skirting a lot of five or six acres or more in performing the feat. We drew a plan of the road in our note-book at the time, and subsequently found a pictorial representation of it (see following page).



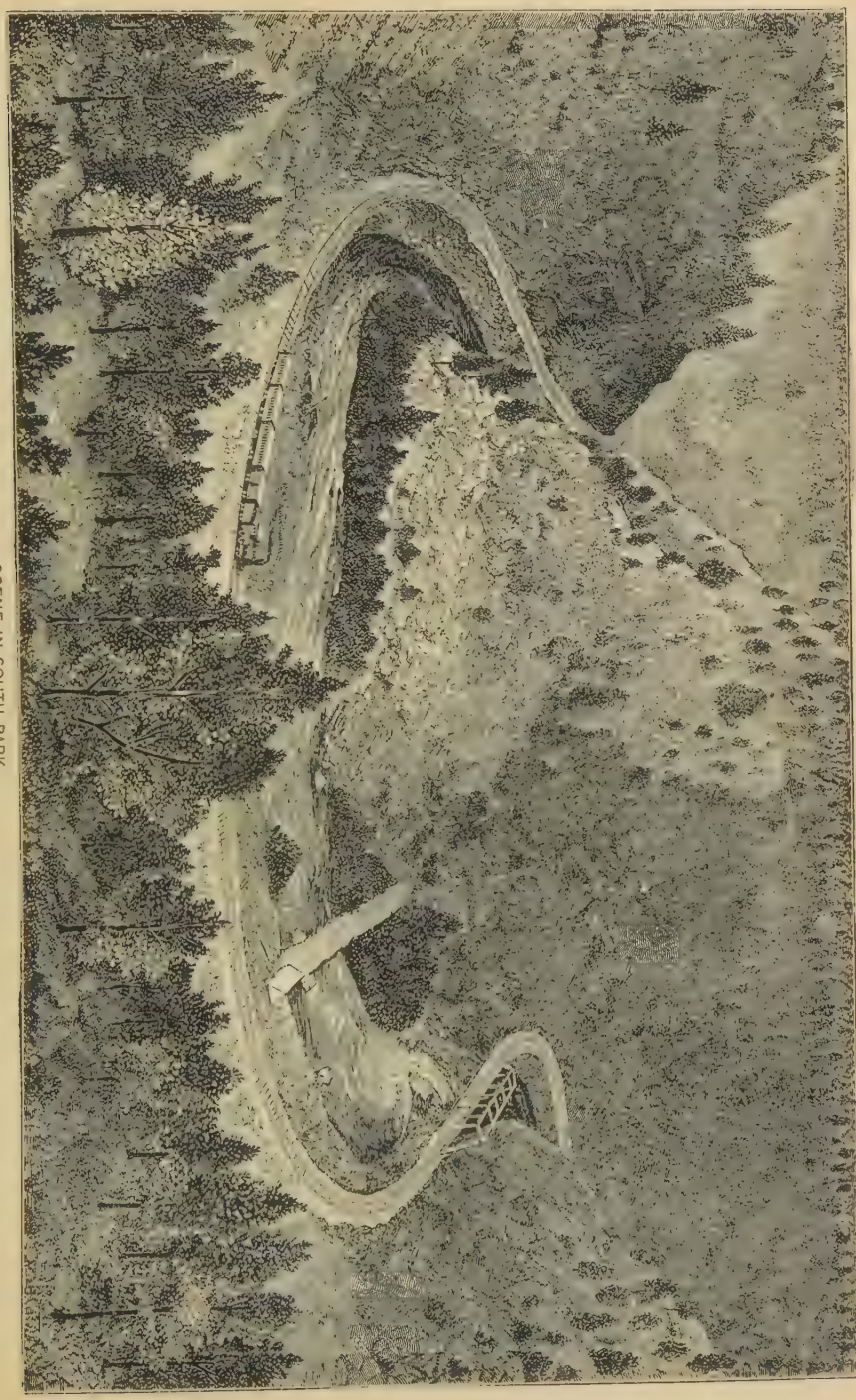
CHALK CREEK CAÑON.

At a point eight or ten miles from the Alpine Tunnel, a passenger said, pointing to the west, "See that black spot yonder! that is the tunnel." The "black spot" appeared to be about as large as a man's hat, and a mile away. All were surprised to be told that it was distant eight or ten miles.

"The tunnel is above timber-line," continued our informant, "too high up for anything to grow."

"What is the altitude?" we asked.

"Eleven thousand six hundred and twenty-three feet above the sea, the highest railway in the world, except one in the South American Andes."



SCENE IN SOUTH PARK.

The tunnel is one thousand seven hundred and seventy-three feet long, with approaches which add eight hundred feet more, and is six hundred feet beneath the Pass. It conducts the passenger from the Atlantic to the Pacific Slope in a few minutes.

Nearly two years were occupied in building this tunnel. "Its twenty thousand lineal feet of California red-wood lining was brought up on pack-horses over trails which had known the touch of no hoof but the mountain sheep's, and where man himself had scarce dared to venture. Operations were carried on from both ends, and, despite the curvature, when the respective gangs first caught the flash of each other's lamps, they were less than one inch out of the way as the engineer had mapped it for them. The great expense was only warranted by the greatness of the country, which is now fastened to the outer world by this link of stygian darkness."

The point in the tunnel where the train passes from the Atlantic to the Pacific Slope is at the centre; and the writer whom we have just quoted says: "The impetus tells the moment it is crossed, and the engines, before goaded to their work, have to be held in severe curb by the courageous drivers. Two drops of water, such as continually fall from the roof, alight but half an inch apart. Trembling a second in the balance, each starts with its fellows; and when they join finally the ocean, there is the span of a continent between them."

The reader may be interested, at this point, in the following about European tunnels. "At the present time the Alpines are pierced by three remarkably long tunnels, entering Italy from France, Switzerland, and Austrian Tyrol, respectively, and called according to the mountain chains that are traversed, the Mt. Cenis, St. Gothard, and Arlberg tunnels. Of these Mt. Cenis is seven miles and three-quarters in length. Its cost was $15,000,000. The St. Gothard tunnel is nine miles and a quarter in length, and cost $13,500,000, the diminution in expense being due principally to the more rapid progress of the work by improvements in the drilling-machines. The Arlberg tunnel is shorter than either Mt. Cenis and St. Gothard, being only six miles and a half. The last and most formidable rival will be the Simplon tunnel, by which the existing line from Geneva to Martigni and Brieg will be carried through the mountains to Dumo d'Ossola, and so on to Pallanza or Stresa on the Lago Maggiore. As this tunnel will be commenced at a much lower level than any of the others, it will necessarily be large, the rough estimate being twelve miles and a half and the estimated cost somewhere about $20,000,000."

On Line of U. P. Railroad. AROUND THE PALISADES.

Emerging from the tunnel upon the Pacific slope, the scene is indescribable. The train creeps cautiously around the Palisades, pausing a few moments for the passengers to take in a view which a trip around the world cannot furnish.

Here the Palisades rise perpendicularly several hundred feet above the track (narrow-gauge), which is hewn out of its side. More than a thousand feet below, the railway, over which the train will pass, is visible, resembling a narrow shelf in the side of the mountain. Two thousand feet and more below is Quartz Creek, running like a thread of silver through the valley. Poised upon this shelf, with unsurpassed grandeur above, around, and beneath, the Christian observer is filled with "wonder, love, and praise." The height is perilous, and the traveller finds himself clutching tightly the platform-rail as he looks down into the deep abyss at his feet; yet devoid of fear. The scene is so novel, so overpowering, and bewitching in its effects, that there is no place for fear. An observer said, what other observers can appreciate, "One forgets that an overturned coach would hurl him thousands of feet down into the abyss, and feels that if such a catastrophe were to happen while his eyes feasted on that glorious landscape, he would die happy."

"How many feet do you think it is down into the valley?" we inquired of a fellow-traveller, in whose face could be seen traces of alarm.

"I have no idea," he answered solemnly, adding, after a moment's hesitation, "we are not far from eternity," — a remark that is true of us mortals at almost any time and anywhere; perhaps a little more significant and impressive up there clinging to the Palisades, nearly twelve thousand feet above the sea. Nevertheless, all things considered, it is true, doubtless, that a man is no nearer eternity when he emerges from the "Alpine Tunnel" than he is on the "Great Plains." There have been no accidents there; every precaution against accident has been provided without regard to expense, not the least of which is the instant stopping of the cars by automatic pressure in case of disaster. We do not deny that there is more danger in travelling by rail over mountains than there is over plains; but the additional novelty and pleasure offsets the peril. While I am writing, the news comes that the air-break of a freight train near Marshall Pass became useless, when the train dashed forward with constantly accelerating speed, until, going at the rate of fifty or sixty miles an hour, the locomotive leaped from the track down into the gorge hundreds of feet below,

carrying the twenty loaded cars with it, — a complete wreck of everything.

Mr. Crofutt relates a thrilling incident in Echo Cañon, illustrative of the foregoing: —

"Mr. Miles, or 'Paddy,' as he was familiarly called, was foreman to the Casement brothers, who laid the track of the Union Pacific Railroad. One morning, Paddy started down Echo Cañon with a long train of flat cars, sixteen in number, loaded with ties and iron rails for the road below Echo City, where were then, as now, the sta-

THE RUNAWAY TRAIN.

tions, switches, etc. The reader will remember that from the Divide to the mouth of Echo Cañon is a heavy grade, no level place on which cars would slack their speed.

"The train had proceeded but a few miles down the cañon, going at a lively rate, when the engineer discovered that the train had parted, and four loaded cars had been left behind. Where the train parted, the grade was easy, hence that portion attached to the locomotive had gained about half a mile on the stray cars. But when discovered they were on heavy grade and coming down on the train with lightning speed. What was to be done? The leading train could not stop to pick them up, for at the rate of speed at which they were

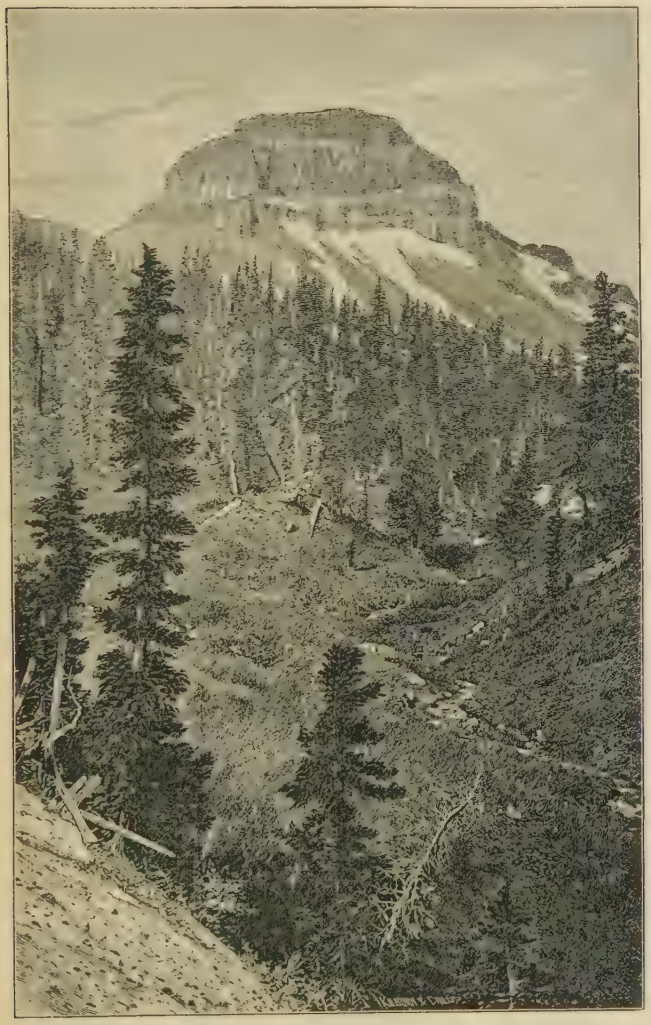
approaching, a collision would shiver both trains, destroying them and the lives of those on board.

"There were two men — Dutchmen — on the loose cars, who might put on the brakes and stop the runaway. The whistle was sounded, but they heard it not; they were fast asleep behind the pile of ties. On came the cars, fairly bounding from the track in their unguided speed, and away shot the locomotive and train. Away they flew, on, around curves and over bridges, past rocky points and bold headlands; on with the speed of the wind, but no faster than came the cars behind him.

"'Let on the steam!' cried Paddy; and with the throttle chock open, with wild, terrible screams of the whistle, the locomotive plunged through the gorge, the mighty rocks sending back the screams in a thousand ringing echoes.

"'Off with the ties!' shouted Paddy once more, as the whistle shouted its warning to the station men ahead to keep the track straight and free, for there was no time to pause — that terrible train was close on to them, and if they collided, the cañon would have a fearful item added to its history. On went the train past the side-tracks, the almost frantic men throwing off the ties, in hopes that some of them would remain on the track, throw off the runaways, and thus save the forward train. Down the gorge they plunged, the terror keeping close by them, leaping along, — almost flying, said one, who told us the tale, — while the locomotive strained every iron nerve to gain on its dreaded follower. Again the wild scream of the locomotive, of 'switches open,' rung out on the air, and was heard and understood in Echo City. The trouble was surmised, not known, but the switches were ready; and if the leading train had but the distance, it could pass on, and the following cars be switched off the track and allowed to spend their force against the mountain side. On shot the locomotive, like an arrow from the bow, the men throwing over the ties until the train was well-nigh unloaded, when just as they were close to the curve by which the train arrives at the station, they saw the dreaded train strike a tie, or something equally of service, and with a desperate plunge rush down the embankment into the little valley and creek below. 'Down brakes,' screamed the engine, and in a moment more the cars entered Echo City, and were quietly waiting on the side-track for further developments. The excited crowd, alarmed by the repeated whistling, was soon informed of the cause of these screams, and immediately went up the track to the scene of the disaster to bring in the dead bodies. When they arrived,

they found the poor unfortunates sitting on the bank unharmed, having just woke up. The first they knew of the trouble was when they were pitched away from the broken cars on the soft greensward. The *débris* of car frames, wheels, and ties, gave them the first intimation they had received that something was the matter."



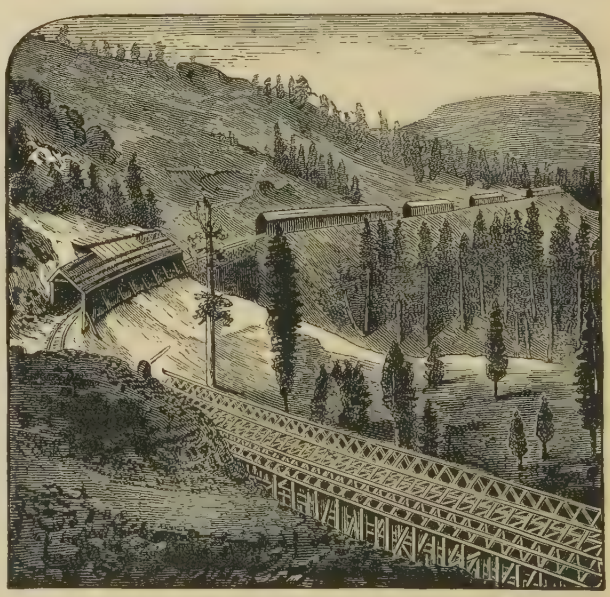
UNCOMPAHGRE PEAKS.

Yes, there is danger, but there is also delight; and the fascination of the latter more than counterbalances the reality of the former.

The descent from the Palisades is made by the "Hair-Pin Curve," so named from the resemblance which the curve in the road bears to a hair-pin.

The array of mountains, and the splendors of the scene on every hand, do not diminish on leaving the Palisades. Grand beyond comparison rises the Uncompahgre, 14,235 feet above the sea, a monarch among the mountain peaks, leaning in royal dignity against the horizon, and looking down from his pinnacle of fame upon the lesser peaks around him.

Ere this the reader has inquired within himself, why railroads in the Rocky Mountains are not blockaded with snow through the winter. At the East, where the snow-fall is far less than it is among the mountains of the West, railroads are frequently blocked with snow for several days. And yet, it is claimed that, on the whole, trains on the mountain-roads are not so frequently delayed by snow as trains are in the East. It was not so, however, in the infancy of these railways, as the long and expensive blockade of February and March, 1869, on the Union Pacific, proves. When the railroad across the continent was built, it was known that snow-sheds or galleries, would be necessary over the Sierra Nevada Mountains, where the snow is often from sixteen to twenty feet deep. But such a safeguard against heavy snows was not thought to be necessary in the Rockies, until experience exposed the mistake. Then snow-fences were resorted to for protection, as in the East, but in many localities they proved useless. Hence, snow-sheds are the chief reliance now. The above cut gives a fine view of a curve in the Central Pacific Railway, on the Sierra Nevada Mountains, with the snow-sheds.



SNOW GALLERIES, SIERRA NEVADA MOUNTAINS.

On one section of this railway there are twenty-eight miles of continuous snow-sheds, including several tunnels from one to sixteen hundred feet in length. If all the snow-sheds built by the Union and Central Pacific were placed in line, they would extend nearly a hundred miles, erected at a cost of one million dollars. They are built in the most substantial manner, stone and the heaviest timber being used. The following cut shows the interior of a snow-shed.

"Snow-slides" are more perilous than snow-storms. Hence

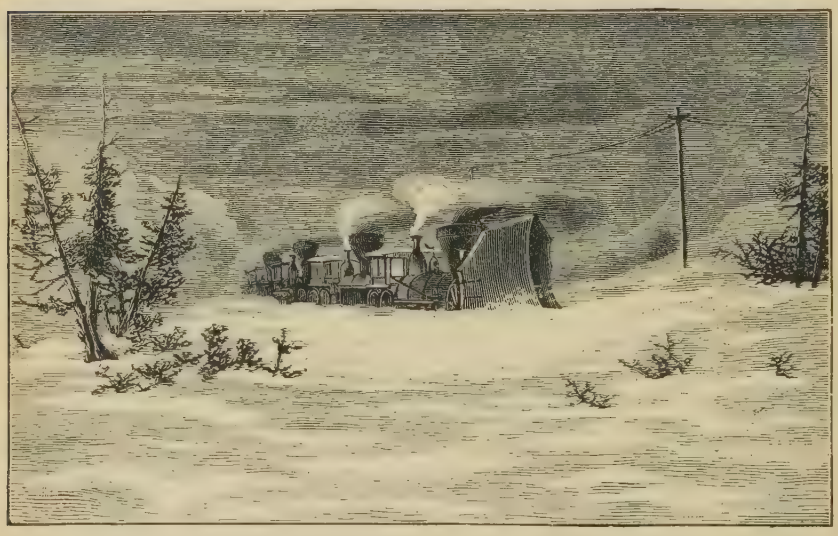
sheds on the mountain sides are built so as to conduct the avalanche over the roof into the valley below; so that while the passenger train glides safely through the artificial gallery, a mighty avalanche of

INTERIOR OF SNOW-SHEDS.

snow may be tumbling over it, and bury, forty feet deep, the hamlet or village in the valley. If a snow-shed be necessary on a comparatively level section, it is built with a sharp roof, like any other building designed to support a heavy weight of snow.

A good idea of the magnitude of a snow-slide may be derived from the fact that, in the winter of 1883–84, a slide completely buried a mining town in one of the cañons of the Rocky Mountains already described, destroying most of the buildings. It is claimed that a snow-slide in the Animas Cañon, six years ago, was a half-mile in length, and when it landed in the deep gorge below, the snow was forty feet deep. A still more disastrous slide, at the Virginius mine, near Ouray, was reported by a Colorado paper as follows:—

"When the avalanche descended upon the boarding-house at four o'clock, Saturday, there were eleven men in it, some asleep in their bunks and others waiting to go on a night shift; while Armstrong and Shieldler were in the kitchen. Boyle escaped through an opening and ran for assistance, and all the men at the mines were speedily engaged in tunnelling the snow to save the buried men.



THE GREAT SNOW-PLOUGH.

"The party from Ouray, which started out Saturday, reached the post-office that night, having had to abandon their horses and use snow-shoes. Reaching the Monongahela mine, they found the Virginius workmen there with four corpses. Sleds were made for the dead bodies, and the parties started yesterday to return to Ouray, David Reed in front breaking the trail. Just as they reached Cumberland basin, another snow-slide came down on David Reed, and in a second had carried him into the air and over a precipice before the

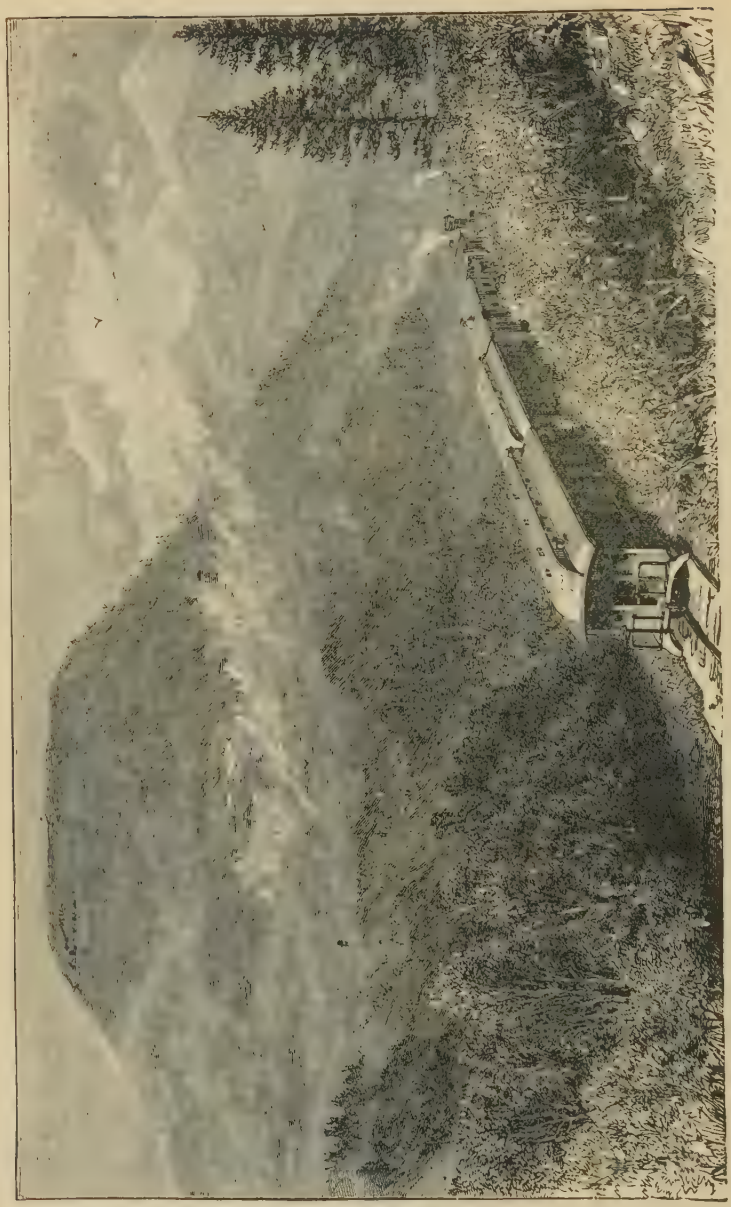
eyes of the horror-stricken men. Following in another instant, a second snow-slide descended upon the whole party, carrying away the thirteen men.

"The sleds they were dragging and the corpses of the men went nearly two thousand feet down the mountain with the slide, four of them being hurled over a precipice five hundred feet high. Superintendent Reed was carried to the edge of a precipice, where a tree caught and held him. The first man to escape from the slide was Doyle, who arose bruised and dazed, and looking around, spied hands and feet protruding from the snow all round. He went to work to help the buried, each man as fast as rescued assisting to save the others till all were rescued. The bodies of the four men killed at Virginius lie under twenty feet of snow, and probably will remain there until spring."

The Central Pacific Railway has a mammoth snow-plough which rests upon two four-wheeled trucks. It is twenty-eight feet long, ten and a half feet wide, thirteen and a quarter high, and weighs FORTY-ONE THOUSAND EIGHT HUNDRED AND SIXTY POUNDS! It was once driven by ten locomotives into a snow-bank on the Sierra Nevada Mountains at the rate of sixty miles an hour.

In this connection the following statement by the London *Times* will be read with interest: —

"A statistical memoir lately issued by the Italian government enables us to form some idea of the great destruction caused annually by avalanches in the Alpine districts of Italy and the Tyrol. In the single district of Val di Susa two avalanches fell on Jan. 18; one, at Devies, between Exilles and Salbertand, was estimated at about sixty metres long and six deep, and slid down the slope a distance of about a kilometre. Its volume is supposed to have been three hundred and sixty thousand cubic metres, and the weight of snow composing it was forty-five thousand tons. It destroyed sixteen houses and killed forty-three persons. The second avalanche of Jan. 18 fell near Venaus, was one hundred and fifty metres long, its volume was about three million cubic metres, and it bore nearly a quarter of a million tons of snow. But although the slide extended to nearly four kilometres, only twenty-four houses were wrecked by it and six persons killed. A third avalanche, which fell at Maflotto, and was computed to contain little more than one thousand six hundred tons' weight of snow, was much more destructive, killing seventeen persons and destroying eighteen homes."



OVER VETA PASS, THROUGH TOLTEC GORGE.

At eight different points the Denver & Rio Grande Railway has crossed the Rocky Mountains, instead of piercing them with long and dismal tunnels. The altitude attained in the passage of Veta

Pass is not so great as that of Alpine or Marshall passes, but the scenery is not less remarkable. The ascent begins along the base of La Veta Mountain, up a defile, at the head of which stands Dump Mountain, defiant and frowning. The railway approaches the mountain by "indirection," and doubles so sharply upon itself that the curve has become famous as the "Mule Shoe Curve."

On Line of D. & R. G. Railway.

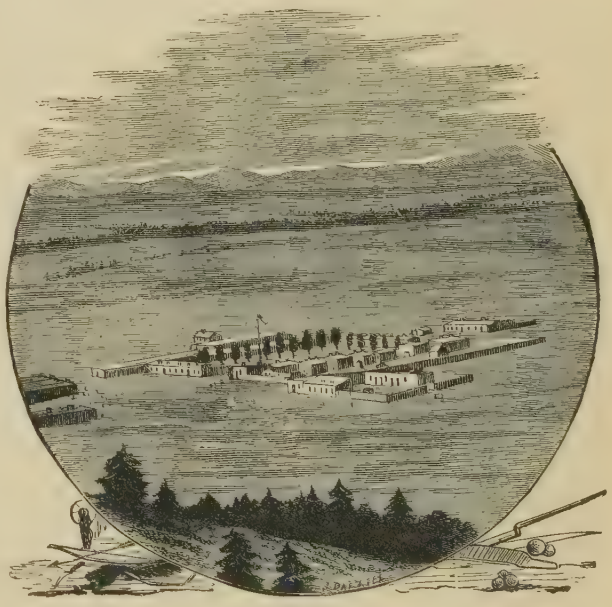
CROSSING SANGRE DE CHRISTO RANGE.

From this point the ascent is very difficult, the grade being two hundred and seventeen feet to the mile. The road-bed is little more than a groove cut in the sides of the mountain, winding hither and thither over the Sangre de Christo Range, which it crosses at Veta Pass at an altitude of nine thousand three hundred and thirty-nine feet. A bowlder started from this point goes thundering down the precipitous walls into the deep, terrible gorge below, a mile away. A tourist christened the railway at this interesting point "RAILROAD ABOVE THE CLOUDS," because, as a matter of fact, tempests rage, and the artillery of heaven thunders and lightens below the track.

Passengers enjoy a sublime view from the train at Veta Pass. Looking eastward, the sky shuts down upon the distant plains, while, at the west, the majestic form of Sierra Blanca, the highest mountain

peak in this country, rises grandly fourteen thousand four hundred and sixty-four feet. To the south, the symmetrical "Spanish Peaks" stand forth so lovely and yet grand in their appearance as to seem phantom-like.

The peaks are respectively twelve thousand seven hundred and twenty and thirteen thousand six hundred and twenty feet high, and are known also as "The Twin Sisters," their Indian name being Wahatoga, which means "breast." These two mountains stand out so boldly as to seem almost separated from the range to which they belong. In a clear day they have been seen from Denver, two hundred miles.

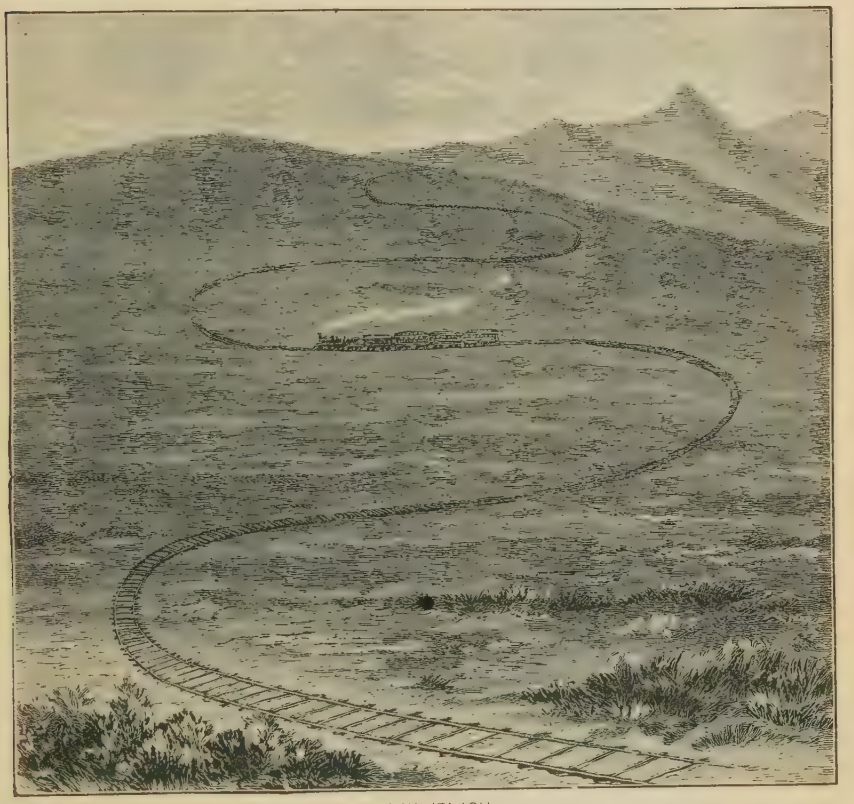


FORT GARLAND.

From Veta Pass the train descends, by a zig-zag course, into San Luis Park — a level tract of land measuring eight thousand square miles, and containing over five million acres, larger than the whole State of Massachusetts. The change from mountain to prairie scenery contributes largely to the novelty and pleasure of the trip. The entrance to San Luis Park is a beautiful picture in itself. Fort Garland is located there for the defence of settlers against the Indians. The buildings are all adobe, that is, built of sun-burnt brick, making a neat, attractive little village. The fort was lately abandoned, we learn, as the danger from Indian depredations has ceased to exist.

It is twenty miles and more from Antonito to the summit of the beautiful mesa which the railway traverses. "The ride up this mesa, for over twenty miles, is one of the most delightful imaginable. The railway mounts the heights by an easy grade, winding in labyrinthine curves among grassy knolls and parks of dark green

pines, and piñons, allowing the passengers to measure the elevation by the plains below, and affording a hundred different views of Sierra Blanca, the Sangre de Christo range, and the smooth outlines of the Antonio Mountains." At one place, the railway doubles upon itself twice, making three parallel tracks in the distance of a few rods, and, from its shape, as represented in the cut, is called "The Whiplash."



THE WHIPLASH.

A waggish traveller, dilating upon the great pleasure to be derived from a ride over this mesa in a Pullman car, says that it is the best illustration he has found of being "carried to the skies on flowery beds of ease."

In this part of Colorado the "Garden of the Gods" is repeated in numerous monumental rocks which appear among the pines, rising in fantastic columns, some of them nearly as high as the trees. The artist has produced an excellent representation of one of the tallest.

One of the most remarkable curves of this railway occurs in one of the wildest localities known. In the valley beneath the road are

numerous tall pine and hemlock trees, with many monumental rocks rising high and dismal among them, as if a cemetery for departed gods had been laid out there, and the silence of the dead had been

LOT'S WIFE.

unbroken until the daring enterprise of civilization penetrated the strange solitude. It is known as "Phantom Curve." With the monument-shaped rocks on one side, and the castellated cliffs, five or six hundred feet high, on the other, the scene is strangely wild and mysterious.

At one point on "Phantom Curve" the first view of Toltec Tunnel is obtained — so far away that it appears only as a small black spot on the face of the cliffs.

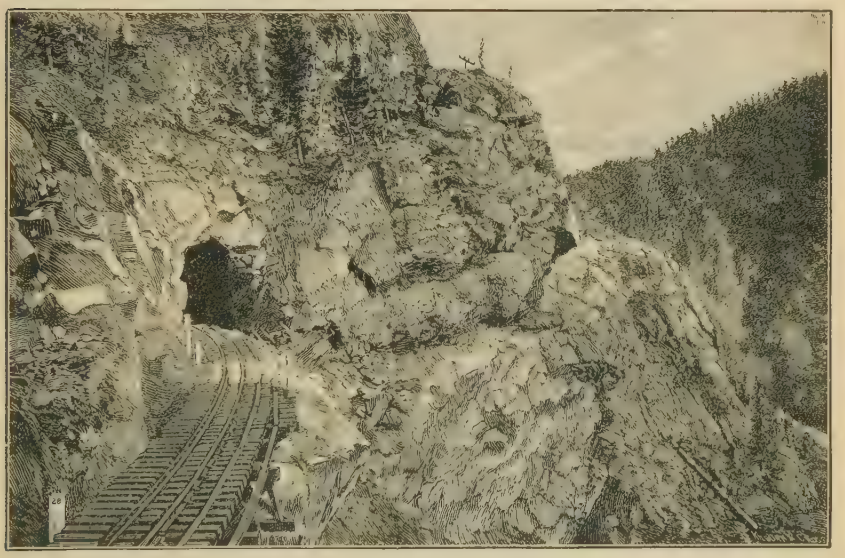
The reader can but partially imagine the grandeur of the scenery viewed from the train at the opening of the tunnel, which is cut six hundred feet through solid rock. A writer says of it: "Here the beauty and the grandeur of the scenery are beyond description. All the features of the landscape are on a Titanic scale. The track over which the train has just passed can be seen circling the brow of the mountain for miles, — a tiny, yellowish thread. Far beyond the distant heights that shut in the valley rises the round top of San Antonio Mountain, while across the valley the opposite mountains rise higher and higher in vast, receding, wooded slopes. The narrow

PHANTOM CURVE.

vale, with its silvery stream and park-like groves of pine and aspen, — among which it would be delightful to camp during the long days of summer, — recalls the happy valley of the Abyssinian princes. Nor is color wanting to complete the charm of the picture. The dark hue of the pines, the light green and white of the shivering aspen, and the red and gray that alternate in the cliffs, add their subtle charms to the sublime panorama. When the train approaches the end of the wall, the passengers look almost straight down to where the stream emerges in foaming cascades from the jaws of Toltec Gorge. Down! down! How little and how much the word may mean! Gazing from some lofty church-spire, or from the top of one of the towers of the New York and Brooklyn Bridge, more than two hundred feet high, who does not grow faint and pale, and feel his heart throbbing fiercely in his breast? But do you call that depth?

TOLTEC TUNNEL.

Double that distance downward from the railway track at Toltec Gorge, and you have hardly begun the descent. The stone you toss from your hand drops far below, and you hear it strike again and again, hundreds added to hundreds of feet distant, and yet silence does not signify that it has reached the bottom; it is simply out of hearing. Double the distance again, so far that the strongest voice can scarcely make itself heard, and when that terrible gulf is passed you might still look down upon the tallest steeple in America; for the railway track at the brink of the chasm of Toltec Gorge is over eleven hundred feet above Los Pinos Creek. But in a flash, in the



WEST END OF THE TOLTEC TUNNEL.

twinkling of an eye, the scene is changed. One parting glance at the far-stretching valley and its mountain barriers, one shuddering, giddy look far down the precipice among the jagged rocks, and then all is hid from view in the darkness of the tunnel."

The train emerges from the tunnel on the west side of the mountain, on the very brink of a frightful precipice, fifteen hundred feet deep, while the cliffs opposite rise over two thousand one hundred feet.

The writer just quoted says: "At the most critical point, where the downward view takes in the deepest depths of the gorge, lined with crags and splintered rocks, and bowlders, as large as churches, fallen from the cliffs above, amid which the stream dashes downward

in snow-white cataracts, the train runs upon a solid bridge of trestle-work, set in the rock, as if it were a balcony from which to obtain the finest possible view of this most wonderful scene."

The cut shows the trestle-work quite plainly, and gives a good idea of the descent on the west side of the mountain. It will be noticed that the "Toltec Gorge" is entered at the top, while the "Grand Cañon of the Arkansas" is entered at the bottom. In the latter, the grandeur is all above the traveller; in the former, it is all below him.

Just west of Toltec Gorge, near the track, is a monument, erected to the memory of the martyred President Garfield, bearing the following inscription: —

In Memoriam.

JAMES ABRAM GARFIELD,

President of the United States. *Died September 19, 1881.*

MOURNED BY ALL THE PEOPLE.

Erected by Members of the National Association of General Passenger and Ticket Agents, who held Memorial Burial Services on this spot,

SEPTEMBER 26, 1881.

September 26 was the day on which President Garfield was buried at Cleveland, Ohio; and this excursion party stopped here for services, and there conceived the idea of erecting a monument upon the spot.

On Line of D. & R. G. Railway.
GARFIELD MONUMENT.

Between Toltec Gorge and Durango the scenery is remarkably diversified. The beautiful and sublime mingle as colors in a fine painting. Where the railway rounds "White Rock Point," the view is scarcely less impressive than that at the entrance of Toltec Gorge.

In this locality we had the first glimpse of "Dogtown," a city of prairie-dogs. Who has not heard of them! And yet, in Kansas, Nebraska, and New Mexico, we caught a glimpse of only here and there one of these historic creatures. But in southwestern Colo-

rado we came upon the famous town, — a locality that swarmed with these lively and somewhat eccentric inhabitants.

The full-grown prairie-dog is about the size of a gray squirrel, though a multitude of smaller ones inhabit the town, which resembles a potato-field — the hills minus the potato-tops. He is a timid, wild little creature, and scampers to his home on the approach of humans, with a shrill, sharp bark, resembling that of a small dog. Dogtown is interesting because it is novel. It speaks well for this race of diminutive dogs that they dwell together in cities like men. Nor is

DOGTOWN.

it at all discreditable to them that they run for dear life on the approach of a locomotive; so that, as another well says, "the town appears alive with projecting noses and disappearing tails." Here and there some, more experienced and bolder than the rest, — perhaps the officials of the city, — sit upon their holes, elevated like potato-hills, and bark defiantly. Dogtown is certainly one of the marvels of the West.

A beaver town is, in some respects, more interesting than a prairie-dog town. Beavers colonize and establish homes with singular ingenuity and perseverance. Fifty years ago, when trapping in the Rocky Mountains was in its prime, the beaver population was immense. They were able to dam large rivers, and even to turn the

course of rivers. Groves of trees they gnaw down and cut up into logs of suitable length for building dams. "They work like beavers" is a phrase suggested by the industry and persistent labors of this little animal. Trappers and tourists frequently discover their dams now, long since built and deserted. William A. Baillie-Grohman, the English author, who has traversed the Rockies from base to top, describes a scene in the Wind River Mountains. "The pools had

BEAVERTOWN.

evidently once been one single lake; but the beaver, by ingenious dikes, had divided it into six or seven smaller sheets of water, lying tier-like, one slightly raised over the other. The nearest to the spring, the water was of course the highest, about eight or ten feet being the difference between its water level and that of the lowest; miniature cascades and channel-like timber floats, connecting the different lakelets. These channels for timber are very ingeniously laid-out contrivances, from three to five feet in width, and from two to four feet in depth; they are intended for floating larger pieces of

wood from place to place, especially where the previously constructed dikes render the transportation of trunks a difficult or impossible job for the little workers."

"Beavers have left far more lasting and useful monuments of their laborious activity on the surface of the country than the aboriginal inhabitants. Whole valleys are fertilized by them, the process being much quicker than one might suppose. Tersely rendered it is as follows: Given a stream traversing a small valley with rocky ground

CAÑON OF THE RIO LAS ANIMAS.

on which grow only occasional cottonwoods; a colony of beaver on taking possession of it will soon make it into meadow land. The grove of trees farthest down the stream is first tackled. When autumn comes, few of them are left to rear their heads. They have been gnawed down, their trunks cut into logs, which form the foundation of an amazingly strong and massive dam stretched across the stream where it is narrowest, forming on the upper side a profound

pool as deep as the dam is high. If the supply of wood lasts, consecutive dams will be built up stream, from thirty to a hundred yards apart, so that finally, in the course of twenty or thirty years, there will be no running water left. I have passed many such streams, when for miles you will pass beaver dam upon beaver dam." He speaks of beaver dams "forty and fifty yards in length, seven feet high, and four feet in breadth at the base, — massive structures wonderfully planned and built."

Animas Cañon is picturesque and remarkably diversified with cliffs, forest, and cascades. The cut gives a view of the cañon where the railway enters it, with a beautiful waterfall opposite. The railway enters the cañon midway between the valley and summit of the mountain, thereby differing from the Arkansas and Toltec cañons, the railway entering the former at the bottom, and the latter at the top. Some of the most difficult railway engineering is seen in this cañon, which is entered sixteen miles from Durango, and extends nearly thirty miles. The track is hewn out of the rocky sides of the mountain, winding around jagged cliffs, hundreds of feet above the valley below, and hundreds from the summit above. Here the grandeur is both above and beneath the traveller.

As the train was crawling very cautiously along this narrow shelf in the mountain, where the descent was so precipitous that passengers had to lean forward from the windows to see the edge of the track beneath the cars, every one maintaining a serious silence which seemed to result from a just appreciation of "the risky business," we said to a member of the British Parliament, who was a passenger, "Any remarks to offer?" Without relaxing the serious features of his face in the least, he replied, "None whatever." This gentleman informed me afterwards, that he had seen the greatest railroad engineering in Europe, and travelled by rail through the wildest and grandest mountain gorges, but nowhere had beheld more of the marvellous in art and nature than he saw in Animas Cañon. For some distance this railway cost one hundred and sixty-five thousand dollars a mile.

The grandest view of the mountains in Animas Cañon is where the "Needles" shoot upwards towards the sky, as strikingly appears in the cut. It is not unlike similar scenes in the Rocky Mountains, except that the figure is clear-cut and peculiar.

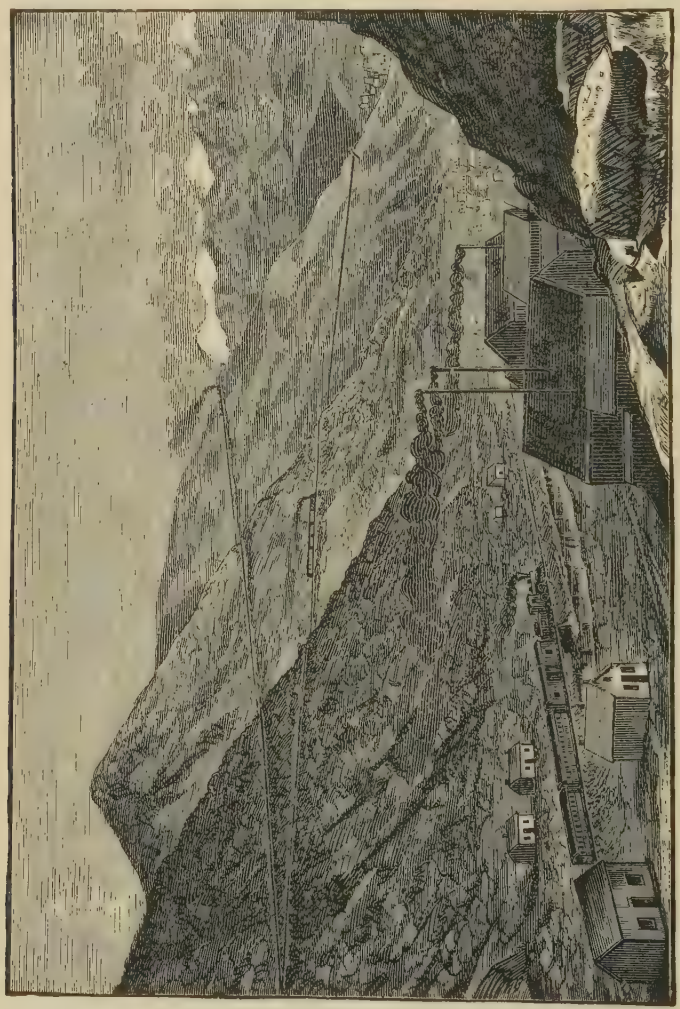
Black Hawk and Central — two mining towns in Clear Creek Cañon — are only one mile apart; indeed, the two towns merge into each other. The climb of a single mile to Central is accomplished

by a "switch-back," making four miles of track necessary. A ride over it is so novel that it becomes sensational. "At one place, streets

On Line of D. & R. G. Railway. ANIMAS CAÑON AND NEEDLES.

are crossed above the level of the house-tops, and at another, after circling the mountain sides for two miles, the train makes its appear-

ance hugging the mountain side hundreds of feet above, and almost directly over the town. One can almost look down into the fiery chimneys of the great smelters, while streets rise above, and seemingly bottomless shafts and excavations yawn beneath in this thrill-



On Line of U. P. Railroad. THE HIGH LINE ROAD BETWEEN BLACK HAWK AND CENTRAL CITY.

ing ride among the gold mines." A good idea of the zigzags, curves, and remarkable ascent of the railway between the two towns in question may be derived from the illustration.

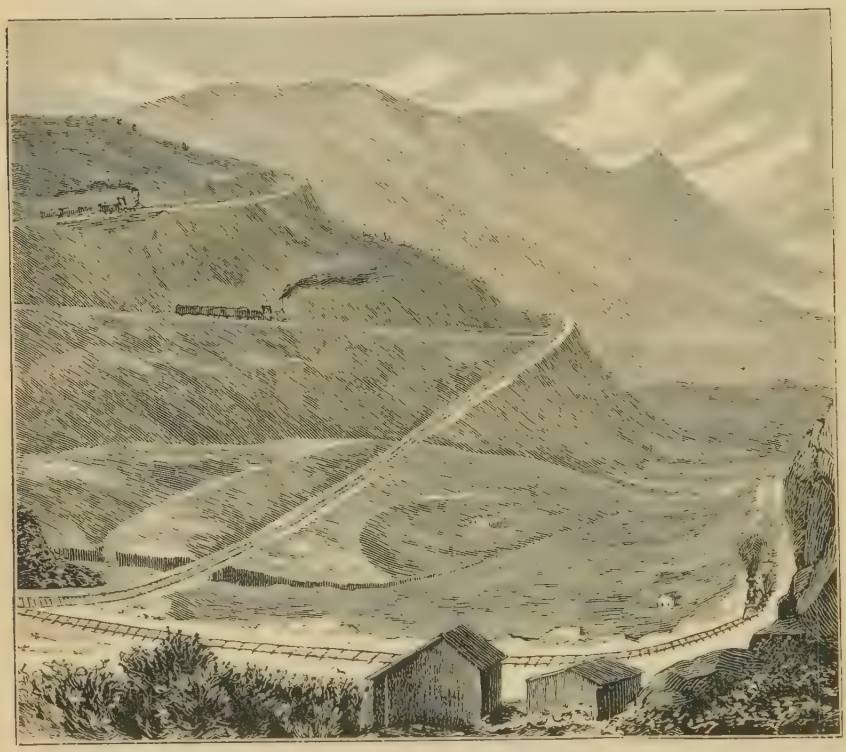
The editor of *The New West* wrote a very graphic description of the Loop above Georgetown, which we copy: —

"Formerly those who had journeyed this far were content, and never dreamed that anything could excel what they had seen. It the unaided imagination were to conjure up something more noteworthy, it would likely be disbelieved by the sober judgment. But in reality Georgetown is passed before an inkling of the real glories of the trip is discovered. This part must be seen. The mind may understand readily, a train winding through a chasm. It is less easy to understand how it begins to rise, rise, rise along the side till finally you look down upon a town in miniature. This is the way the train proceeds. Through the suburbs of Georgetown, it worms its way up a steep grade, curved and blasted through the rock. It crosses the road leading to Green Lake, which every tourist must traverse before leaving Colorado, and skirts the side of mountains which lose their crests in snow. In the valley flows the little stream of Clear Creek. Past Devil's Gate and Bridal Veil Falls, curves and climbs the engine. Looking directly above you, you perceive a railroad track on a high iron bridge crossing the one you are following almost at right angles, but in the form of a crescent. You wonder what road that is above, and how it got there. For a little way the track is comparatively straight, then it veers to the right, crosses the creek and starts down the valley, but still up grade. For perhaps a quarter of a mile this continues. Then the creek is crossed again on a high iron bridge. Looking directly down you perceive a track below you. You wonder what track it is, and how it got there. Look again. It is your own track. You are on the bridge up to which you were looking a moment ago. You have ridden over an immense loop, one of four in existence. There is one on the Southern Pacific, one in Switzerland, and one in the Andes of South America. But this one

THE LOOP.

is more complex than any of the others, the strangest feat the most skilful engineer ever accomplished.

"The wonderful bridge is three hundred feet long and eighty-six feet high. From it Georgetown may be seen one way, nestled in its mountains, and the other way there is a confusion of tracks. It is a remarkable climb from the bridge over a fill seventy-six feet high on too sharp a curve to admit of a bridge. There comes near



CROSSING THE RATON MOUNTAINS.

being a duplication of the loop. From here Georgetown is still in sight beyond the three parallel tracks necessitated by the loop. Looking down from the final curve shown in the cut, it is easy to perceive that the display is a puzzle. There is a wealth of track, but it dodges hither and thither, no portion seemingly having any special relation to its neighbor. Occasionally the entire trackage comes in range at once. Then Silver Plume is reached, and the return trip begins.

"The distance from Georgetown to Silver Plume, in an air-line,

is a little over a mile; by wagon road, two miles; by rail, four and a half miles. It is easily perceived that the extra distance is the only method of conquering the grade. Iron is not laid for pastime in the Rocky Mountains. The cost of this bit of eccentricity in railroading was two hundred thousand dollars. The cost of building clear to Bakerville, eight and a half miles, from Georgetown was four hundred and sixty-five thousand dollars. What the ultimate destiny of the road may be is a question. If extended to Leadville, it would shorten the distance between that place and Denver to one hundred and twelve miles. By the South Park, now far the shortest line, it is one hundred and fifty. But whatever it may be, and may do, it has certainly given to the tourist opportunity never before offered to inspect the wonders of nature and mechanical science."

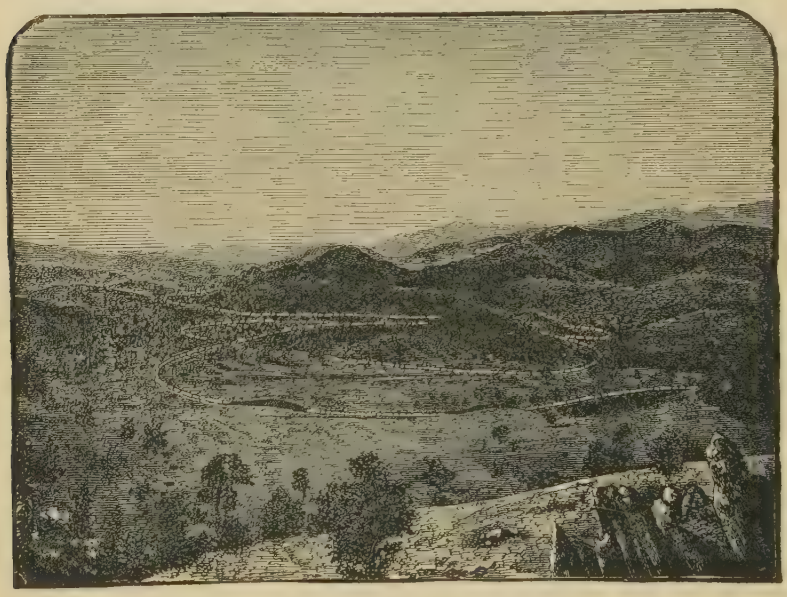
We described the "switch-back," by which the cars are able to ascend from Black Hawk to Central. On a grander scale, the same device carried the train, on the Atchison, Topeka & Santa Fé Railroad, over the Raton Mountains — a spur of the Rocky Mountains — into New Mexico.

It is fifteen miles from Trinidad to the summit of the pass, and an average rise of one hundred and twenty-one feet to the mile is required. If this rise were equally distributed, it would not be excessive; but it is not. In some places the railway must ascend nearly two hundred feet to the mile; and, on the home-stretch, the rise is over three hundred feet to the mile, and at first was accomplished by a switch-back. "By it the cars left what is now the direct line, and were carried over a steep incline track, running diagonally up the hill; thence, reversing their direction, they shot up another incline; then reversing again, they climbed to the summit, thus zigzagging up the steep they could not directly scale. Even by this indirect route, the enormous grade of 316.8 feet per mile was attained." On the New Mexico side, the railway descended, in like manner, to a point where a tunnel, two thousand and eleven feet long, has been excavated, thus superseding the use of the switch-back, and shortening the line by several miles. The cut opposite furnishes a correct view of the railroad over the mountain.

There is another very remarkable loop in the Tehachapi Pass, California. The next illustration shows the course of the railway to the summit of the pass, together with the loop. Within twenty-five miles, the train rises nearly three thousand feet, — the altitude at the pass being three thousand nine hundred and sixty-four feet, — passing through SEVENTEEN tunnels, the aggregate length of which

is 7,683.9 feet. The tourist is well paid by this wonder for his longest trip.

The loop is three thousand seven hundred and ninety-five feet in length, the upper track being seventy-eight feet higher than the lower track. The engineering skill displayed in the construction of this road will amply reward the tourist for his journey across the continent to see it. The scenery along the route is indescribably grand. Sometimes the train poises upon a dizzy height, from which the traveller looks down into frightful chasms that make him



THE LOOP, TEHACHAPI PASS.

shudder. The loop is three hundred and forty miles from San Francisco.

After passing through the ninth tunnel, the track makes a graceful curve around the loop, and crosses it, at a distance above, as represented by the following cut. Let the reader take in, if possible, the engineering feat which the illustration correctly represents. There is the ninth tunnel, and the railroad train crossing both tunnel and loop far above it. Surely, here is a marvel of American enterprise!

In descending the Sierra Nevada Mountains, from Summit to Colfax, the Union Pacific train winds around many precipitous cliffs, affording the traveller a favorable opportunity to look down into many

frightful chasms. The most remarkable of these cliffs is represented by the cut (p. 320) called "Cape Horn." There is the train rounding it, at a height well calculated to excite alarm, — the last place a railway train would have been placed, even in the dreams of an enthusiast, thirty years ago. Some travellers claim that the grandest and most exciting railway ride in the whole world is this from Summit to Colfax. No language can describe the scenery. Timid souls shrink and tremble, possibly, whirling around perilous curves, and rushing forward on the edge of awful precipices. But the experience pays.

OVER TUNNEL AND LOOP.

The memory of the ride will be reckoned as an income during the remainder of life.

Marvellous railway engineering, on the Sierra Nevada range, is seen in the American River Cañon, as represented by the cut on p. 321.

The grade of this road for seven miles is six hundred feet to the mile — too steep, of course, to be operated by steam; so it was built to be operated by mules. Some of its curves are thirty degrees. The whole of its work is the triumph of enterprise over stupendous obstacles.

The Calumet Branch Railway of the Leadville division of the Rio Grande is a marvellous affair, and the reader will be interested in

ROUNDING CAPE HORN.

the following description of it, by one who is perfectly familiar with minutest details. He says: —

"Nobody has ever well described the wonderful little feeder of the Leadville division which modestly leaves the main line in Brown's Cañon, and ascends the mountain gulches to the east with the steep-

est grades and the heaviest curves in the world that are overcome with the ordinary drive-wheel locomotive. Afar up in this range of mountains, seven miles away, and nearly three thousand feet higher than the bed of the cañon, is the famous Calumet mine, from which is extracted the hematite iron ore that keeps in blast the furnaces of the Bessemer works at Pueblo. Every morning of the year a ponderous locomotive and a small train of cars toils up this steep, and every afternoon they make the perilous descent to the valley, loaded

AMERICAN RIVER CAÑON.

with iron, with the steam brakes on the cars, the water pressure on the locomotive drivers, and a man standing at the brake-wheel of each car.

"This is the most wonderful piece of railroading in the universe. The maximum grade is four hundred and six feet to a mile, or nearly eight per cent, and the maximum curvature, twenty-five degrees. The terminal of the branch is half a mile higher than the commencement. Imagine, then, the difficulty in ascending with empty cars, and the danger of descending with loaded ones. Still, strange though

it may seem, a locomotive cannot make the descent unless at least five cars are attached. The latter are essential to provide the resisting power for the steam brakes. The trip up is snalish; the return is rapid in spite of the steam pressure which cuts the car-wheels into sparks that fly out in a constant stream from the brakes, in spite of the reverse action, in spite of the lavish use of the sand-pipes, and in spite of the water brake on the locomotive drive-wheels.

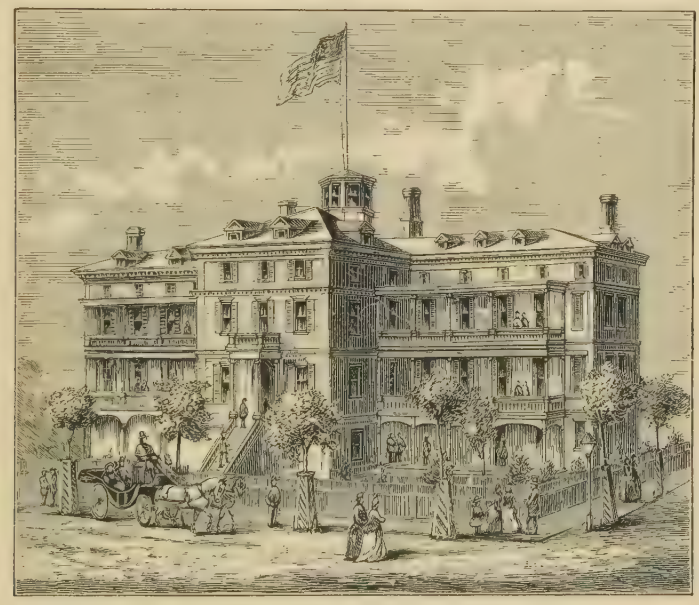
"Some few years ago, when the operation of the line was commenced, runaway accidents were of almost daily occurrence. The seven miles were within a brief period strewn with the wrecks of cars and locomotives and iron ore. The most discouraging results attended the persistent efforts to make the line serve the purpose for which it was constructed. Day after day control over the descending train would be lost; some defect would interfere with the working of the steam brake; and even with the brake in successful operation, the train would take a crazy notion and go flying down the mountain sides, along the brinks of fearful precipices, through the rock-bound gullies, and around the acute curves like a bolt of lightning. The train hands would leap for life, and the locomotive and cars would be dashed into fragments. In all these accidents, however, nobody was hurt. Thousands and thousands of dollars' worth of rolling stock is said to have been destroyed before a successful system of operation was established. Only very few of the higher officials of the Rio Grande realize how terrible was the experience of these rides, and it is told of two of them who once summed up sufficient curiosity and courage to make the journey that they were so frightened that they hung on to the steps of the caboose, expecting every moment to have to leap for life.

"Finally, extremely heavy locomotives were built, and a force of exceptionally brave trainmen were secured. The latter were instructed to cling to their post at every hazard, and to never flinch in the moment of danger. Not a serious accident has been recorded since. Starting from the mine, every brake is manned, so that in case the steam should fail, the train could be checked. While there have been several runaways, in two years there has not been a wreck. The sight of one of these trains descending is one of thrilling interest, the sparks from the car-wheels cutting a pathway of light down the mountains, which can best be described as having the appearance of a molten stream of fire rolling down to the river-bed of the cañon.

"In Switzerland there are grades as steep as these of the Calumet

Branch, but they are equipped for operation with the cable and cog-wheels."

The leading railway companies in the New West support hospitals for their employees. The cut below represents the Central Pacific Railroad Hospital at Sacramento. It is a fine stone building, occupying an open square, and was erected at an expense of sixty thousand dollars. Here the sick or injured employee finds a pleasant home, with the best of care, until he is restored, and is able to return to work. The physician who has this hospital in charge stands at the head of his profession in Sacramento, and he is provided with the



CENTRAL PACIFIC RAILROAD HOSPITAL.

best of nurses, and other facilities to make a first-class hospital. A monthly assessment of fifty cents each, from officers and men, beginning with the president of the company, pays the current expenses of the institution. This wise provision for the sick and suffering is very popular with the men and their families. To them it is a pledge of help in the time of need.

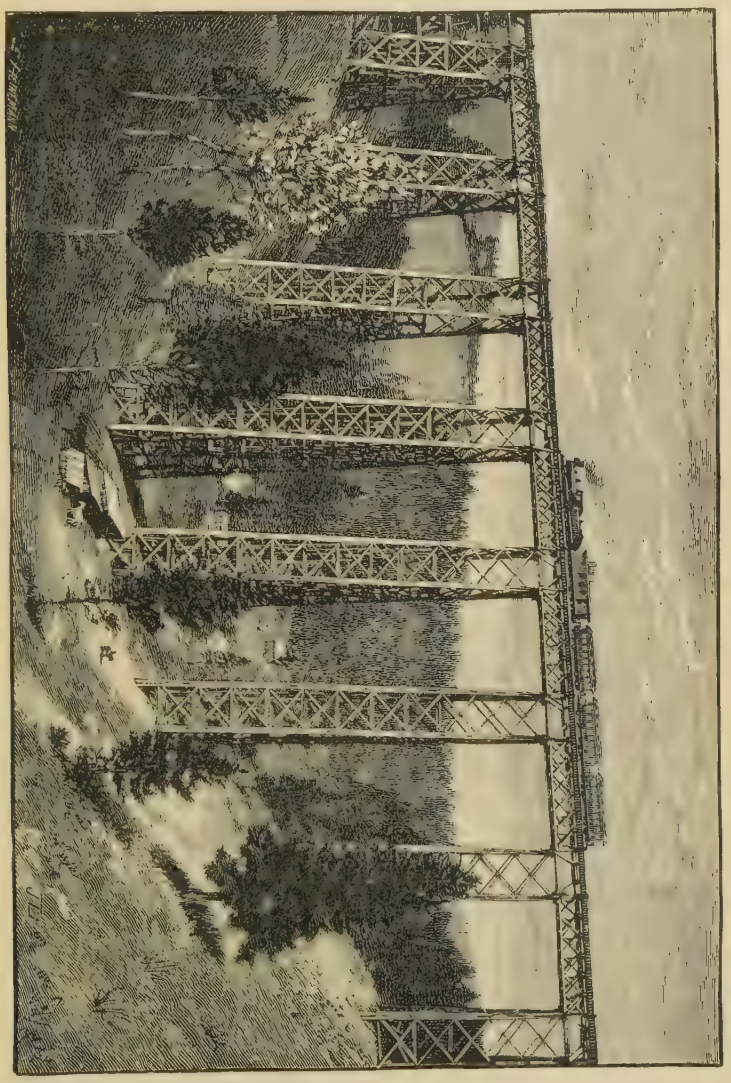
It is common, also, for the railroad companies of the New West to provide reading-rooms for their employees. We have been furnished with the following account of what the Atchison, Topeka & Sante Fé Railroad has done in this line: —

"The Atchison, Topeka & Sante Fé Railroad Company has es-

tablished a rather extensive system of reading-rooms for the benefit of their employees throughout Kansas and New Mexico. The rooms are comfortably furnished, heated, lighted, and kept neat and clean by the company. The company provides all the better periodicals of the day, games, and mechanical reference books. It, however, depends upon voluntary contributions of the citizens where these rooms are located to supply a library. There are fifteen of them located at the various division points. At Argentine, New Mexico, quite a number of handsome volumes have been generously donated by private citizens. At Emporia, Kan., the citizens have come forward promptly, and a New York gentleman has donated one hundred volumes to that reading-room. Topeka also has one. At Nickerson, Kan., the people have responded very generously, as also at Dodge City and Raton, Kan., while at Las Vegas a very fine collection of books has been presented by the citizens. At San Marcial a collection of about two hundred volumes of the best standard literature has been presented by the Hon. E. W. Kinsley, of Boston."

Railroading in the New West makes mammoth bridges a necessity. The bridge over the Missouri River, at Omaha, is a great work, both in conception and execution. It is one mile in length including its approaches. It is "Post's Pattern." "The hollow iron columns are twenty-two in number, two forming a pier. These columns are made of cast iron, one and three-fourths of an inch in thickness, eight and a half feet in diameter, ten feet long, and weigh eight tons each. They are bolted together air-tight, and sunk to the bed-rock of the river, in one case, eighty-two feet below low water. After these columns are seated on the rock foundation, they are filled up twenty feet with stone concrete, and from the concrete to the bridge seat they are filled with regular masonry. From high-water mark to the bridge seat these columns measure fifty feet. The eleven spans are two hundred and fifty feet in length, making the iron part between abutments, two thousand seven hundred and fifty feet. These columns were cast in Chicago, and delivered in the shape of enormous rings, ten feet in length. When they were being placed in position, the workmen would take two or more rings, join them together, place the column where it was to be sunk, cover the top with an air-lock, then force the water from the column by pneumatic pressure, ranging from ten to thirty-five pounds per square inch. The workmen descend the columns by means of rope ladders, and fill sand-buckets, which are hoisted through the air-lock by a pony-engine. The sand is then excavated about two feet below the bottom

of the column, the men come out through the air-lock, a leverage, from one hundred to three hundred tons, is applied, the pneumatic pressure is removed, and the column sinks, from three inches to two



MARENT GULCH BRIDGE.

and one-half feet — in one instance, the column steadily sank down seventeen feet. Whenever the column sinks, the sand fills in from ten to thirty feet — in one instance, forty feet. This has to be excavated before another sinking of a few inches can take place, making altogether a slow and tedious process."

Congress authorized the building of this bridge, July 25, 1866, but little was done upon it until March, 1868. Then work commenced in earnest, but was discontinued for some reason, after sixteen months. Again, in April, 1870, the American Bridge Company of Chicago took up the work; but it was not carried to final consummation until Congress authorized the Union Pacific Railroad, Feb. 24, 1871, to complete it, and issue bonds to the amount of $2,500,000.

The Marent Gulch is in the Cariacan Defile, on the Northern Pacific Railway, not far from the Flathead Reservation. The stream flowing through it is small, but the gulch is deep and dismal. The bridge over it, represented by the cut on page 325, is one of the highest in the United States. It is two hundred and twenty-six feet high and eight hundred and sixty long. It is a Howe truss resting on eight towers.

Near by this structure is another large bridge — the O'Keefe bridge — one hundred and twelve feet high and one thousand feet long.

The Northern Pacific Railway passes through Clark's Fork, where not even a wagon-road existed before, nothing but a perilous bridle-path travelled by Indians, gold-seekers, and fur-traders. Pack-animals could not travel over twelve or fifteen miles a day on this trail.

Clark's Fork is spanned by three mammoth bridges. The first is a five-span Howe truss, eight hundred feet long, with trestle approach of six hundred feet — fourteen hundred feet in all. Fifty miles further up is another Howe truss bridge, of three spans, four hundred and eighty feet long, and ninety feet above the water. The third bridge is situated seven miles above the junction of the Flathead and Missoula, and is ten hundred and fifty feet long, including approaches.

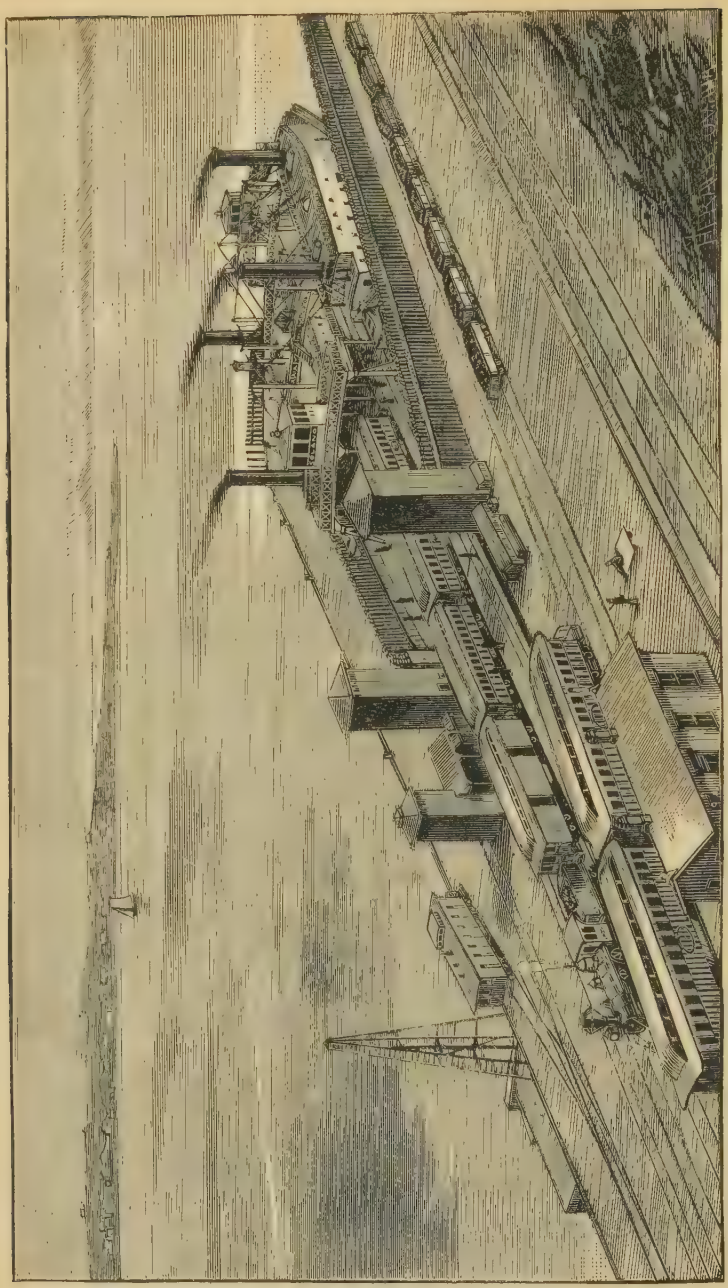
Smalley, in his "History of the Northern Pacific Railroad," says: "In the rock-work Mr. Hallett employed a method new in railroad construction, which he had first successfully used on the Columbia River line. The old way of cutting a roadbed along the face of a cliff was to begin at the top, drill small holes and blow off the rock, little by little, down to grade. Mr. Hallett began at the bottom, a little below grade, made a number of T-shaped tunnels, filled them with great quantities of powder, and touched them all off at the same moment by electricity. The effect was stupendous, the whole side of the mountain wall being lifted up and hurled into the river. Great saving in time and money was thus effected. A similar method was applied to through cuts by means of perpendicular shafts and lateral galleries. One cut twenty-four feet deep by four hundred feet long

was excavated by a single blast of giant powder, most of the rock being thrown entirely out, and the rest so broken up that it was readily removed by derricks."

The same authority tells us that the most stupendous land-slide known in railroad-building occurred in this vicinity in April, 1883. "Forty acres, covered with trees, slid off into the river, carrying the track with it, and partially obstructing the river."

The magnitude of business and enterprise in the New West also creates the necessity for the largest ferry-boat in the whole world. It is found on the Straits of Carquincy, in California, and is run by the railway company to shorten the distance to Sacramento. The Straits are one mile and a half wide.

Crofutt describes this monster ferry-boat as follows: "The 'Solano' is the same length as the 'City of Tokio,' and has the greatest length of beam of any vessel afloat. Her dimensions are: length over all, 424 feet; length of bottom, — she has no keel, — 406 feet; height of sides in centre, 18 feet 5 inches; height of sides at each end from bottom of boat, 15 feet 10 inches; moulded beam, 64 feet; extreme width over guards, 116 feet; width of guards at centre of boat, 25 feet 6 inches; reverse shear of deck, 2 feet 6 inches. She has two vertical steam engines of 60-inch bore and 11-inch stroke. The engines have a nominal horse-power each, but are capable of being worked up to 2,000 horse-power each. The wheels are 30 feet in diameter, and the face of the baskets, 17 feet. There are 24 baskets in each wheel, 30 inches deep. She has eight steel boilers, each being of the following dimensions: length over all, 28 feet; diameter of shell, 7 feet; 143 tubes, 16 feet long by 4 inches diameter each; heating surface, 1,227 feet; grate surface, 224 feet; entire heating surface, 9,816 feet; entire grate surface, 1,792 feet. The boilers are made in pairs, with one steam smoke-stack to each pair, 5 feet and 6 inches in diameter. She has 4 iron fresh-water tanks, each 20 feet long and 6 feet in diameter; registers 483,541.31 tons. She is a double ender, and at each end has four balance rudders, each 11 feet 6 inches long and 5 feet 6 inches in depth. They are constructed with coupling-rods, and each has one king-pin in the centre for the purpose of holding it in place. The rudders are worked by an hydraulic steering-gear, operated by an independent steam pump, and responds almost instantaneously to the touch. The engines are placed fore and aft, and operate entirely independent, each operating one wheel. This arrangement of the engines and paddles makes the boat more easily handled entering or leaving the slips, or turning quickly when required, as one wheel



STEAMER "SOLANO."

can be made to go ahead and the other to reverse at the same time. One wheel is placed eight feet forward, and the other eight feet abaft

the centre of the boat. It has four tracks running from end to end, with the capacity of 48 freight, or 24 passenger cars. In its construction, 1,500,000 feet of lumber were used. Many of the timbers are over 100 feet long; four, the keelsons, are 117 feet long, each measuring 4,032 feet."

PUBLIC BUILDINGS.

We turn to other illustrations of the marvellous enterprise of the New West. Public buildings show the public spirit of the people. Their thrifty business and large prosperity appear through these. They proclaim the purpose, intelligence, and aim of those who build and pay for them.

When the ground was broken for the railway at Omaha, the town contained about three thousand inhabitants. The first "claim cabin" was built there in 1854. A young man said to the author, in August, 1883, in Omaha, "I am twenty-five years of age this month, and I was one of the first babies born in this town, the population of which is now *sixty thousand*."

Population of Omaha now, 140,000; area, 24⅛ square miles; bank clearings in 1890, $257,235,190.27; wholesale trade, $47,214,790; building, $10,243,909; manufactured products, $54,000,000; real estate sales, $18,283,436; actual valuation of city, $200,000,000. The city has 94 miles of street railways, operated principally by electric motors; 155 miles of water mains, with 1513 fire hydrants; 85 miles of gas mains, with 930 gas lamps; 135 electric arc lights and 593 gasoline lamps; 9 National and 9 Savings Banks, and 2 State banks, the National Banks having capital of $4,000,000 and deposits of over $18,000,000; over 50 public, and many private, schools, with 425 teachers and 16,336 pupils, costing annually $344,394.48 to support; schoolhouses valued at $609,250; 99 churches, many of them having fine edifices; a public library of 35,000 volumes; 4 daily and 13 weekly papers; with business college, medical college, Creighton's College, hospital costing $325,000, etc.

The first building which the traveller sees on approaching Omaha is the high school, a costly and imposing structure. It is situated on Capitol Hill, the highest point of land in the city, where the old state-house stood. It is 176 feet long and 80 feet wide. The main spire rises 185 feet from the ground. It was completed in 1876, and cost $250,000. It was but ten years after breaking

HIGH SCHOOL BUILDING, OMAHA.

ground for the Union Pacific Railroad that this structure was reared. The State Capitol was first located here, but was removed to Lincoln, in 1868.

Such a noble structure for the education of the young tells its own story. The community which demands such a building, at a

time when enormous taxes are levied upon its property, must set a high value upon education. This edifice is a standing monument to the praise and honor of the people, as well as proof of their enterprise and generosity.

The court-house covers an area of 112 x 130 feet, exclusive of approaches and the grand staircase, on the Farnum Street front.

COURT-HOUSE.

The height of the building, from base to the statue over the dome, is one hundred and forty feet. It is built of stone from the Berea sandstone quarries of Ohio, at a cost of $350,000. It is fire-proof. It is provided with all the appointments of a first-class court-house in the East.

It is a wise policy which erects a permanent public building for the future as well as the present. Fifty years from now, and more, this

court-house will meet the wants of the public service, and, at the same time, continue to be an ornament to the city. Instead of grumbling at the large cost of the structure, posterity will honor the memory of the builders all the more; for it furnishes proof of their earnest public spirit in the most enduring form.

Portland is one of the most stirring and thriving cities on the continent. Its population, including East Portland, is about fifty thousand. It is situated on the west bank of the Willamette River, twelve miles from its junction with the Columbia. In beauty of location and architecture, it is unsurpassed by any Eastern city.

The following facts exhibit the remarkable enterprise and growth of the city, which contains, at the present time, a population of nearly fifty thousand inhabitants. Its growth in 1890 outstripped that of any previous year; and it is not presumptuous to say that its growth in this year of 1891 will be still more surprising.

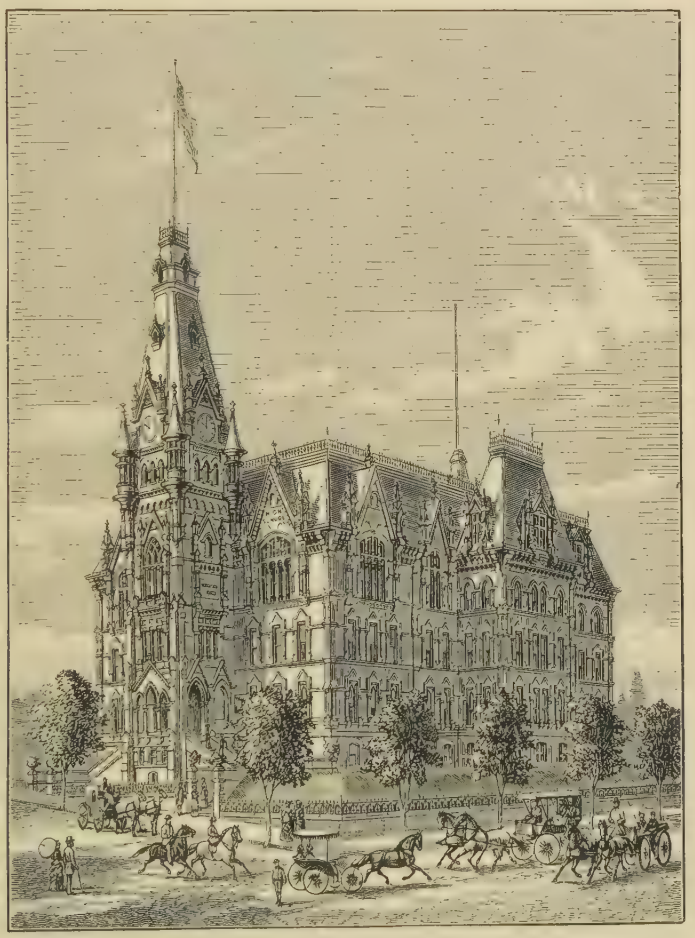
Portland has much wealth, 616 of her citizens being worth more than $10,000 each. Its assessed valuation in 1890 amounted to $40,000,000, the actual value of its property exceeding $150,000,000. Its wholesale trade was $135,000,000, in the same time; its exports, $12,000,000; its receipt of wheat and flour, 231,305 tons, of which 193,293 tons were shipped; its exchanges, $93,000,000; bank deposits, $12,000,000; its manufacturing products, $27,000,000. More than 10,000 employees were engaged in its factories. $70,000,000 were invested in its business. 2,000 buildings were erected in 1890, including those of East Portland and Albina, at a cost of EIGHT MILLION DOLLARS. In 1889–90, $2,000,000 were spent on street railways, and electricity was introduced to light the city and run the cars.

Portland's prospects were never brighter than they are now (1891). Her former array of magnificent business blocks and public buildings is being eclipsed by those now in process of erection. A Union Depot is building, at a cost of $1,200,000. It will be 500 feet long and 60 wide, the main passenger room projecting 100 feet, with a tower 149 feet high. The new Chamber of Commerce edifice will cost $400,000, and will be second to no other structure of the kind, East or West, in beauty and appointments. The Marquam Opera House, with its three costly towers, eight stories high, will cost $300,000.

The new City Hall, to be completed in 1892, will cost $500,000. The orator, at the laying of the corner-stone last December, remarked: "What greater contrast than that between the Portland of to-day, laying the corner-stone of this City Hall, and the yet unnamed local-

ity in the primitive and almost impervious forest, where William Overton, stepping from a canoe on a November day in the year 1843, exclaimed, 'I settle here; this is my claim!'"

The United Banking Building will be eight stories high, and will cost $350,000. The new quarters for the *Oregonian*, Portland's lead-



HIGH SCHOOL BUILDING, PORTLAND.

ing newspaper, rapidly advancing to completion, will be a noble structure, costing $250,000. A new library building is being erected at an expense of $100,000. The First Congregational Church is building a house of worship to cost $80,000, with seating capacity for 1,100 people. Other fine structures that will greatly add to the attractions of the city, especially business

blocks, are under contract; several of them will not be completed until sometime in 1892.

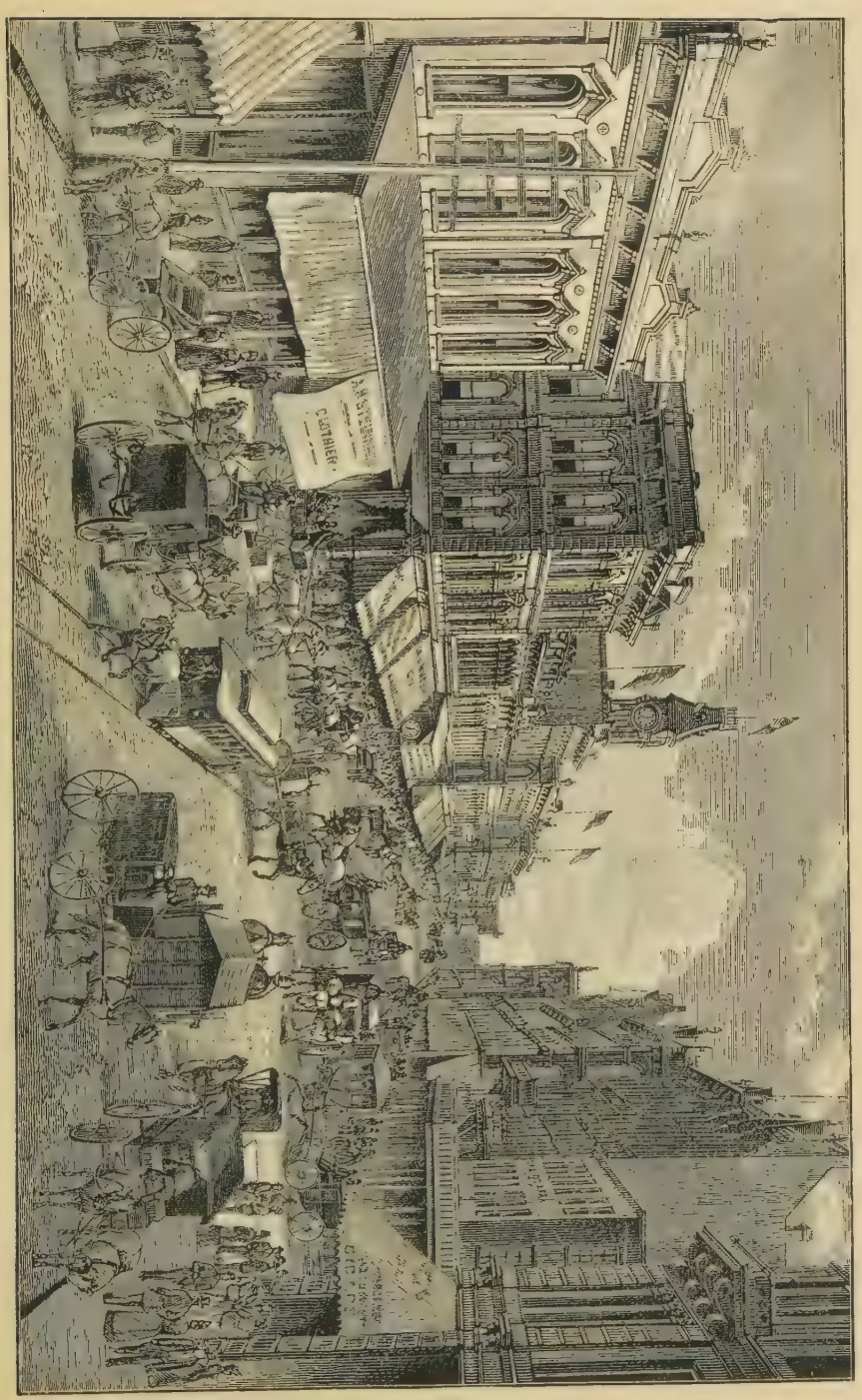
The schools of Portland demand special mention. Its High School building is a model of symmetry and beauty, as the illustration on page 333 is ample proof. The other schoolhouses are fine, the city having $400,000 invested in them, accommodating 5,000 pupils, expending upon them $150,000 annually, including $80,000 paid to 100 teachers. Several first-class private schools furnish instruction to a large number of pupils in addition to the above. The public school system of Portland loses nothing in comparison with that of New England cities.

The city has been very fortunate in its choice of experienced and practical men to take charge of its public schools, — men who appreciate the value of common school instruction to the masses, and hence its priceless worth to the town in its future progress. Their wise counsels have been characterized by harmony of plan and action from the outset; and their selection of teachers has won the confidence of parents to a remarkable degree. Under such administration, public schools flourish and yield their richest fruits. Throughout the New West this kind of fitness for school supervision prevails.

The city is well supplied with newspapers and magazines of a high order. The *Oregonian* and *News* are morning dailies with weekly editions. The *Standard*, *Telegram*, and *Freie Presse* are evening dailies — six daily papers in all. There are from fifteen to twenty other periodical publications, among which is *The West Shore*, inferior to no illustrated monthly in the United States for the place it is designed to fill. We here and now acknowledge our great indebtedness to its able editor for a great amount of information, as well as fine illustrations, in the preparation of this volume.

Portland, Oregon, contains many fine business blocks, one of which is shown on p. 336. Forty-five years ago the first business house of Portland was erected — a small log house.

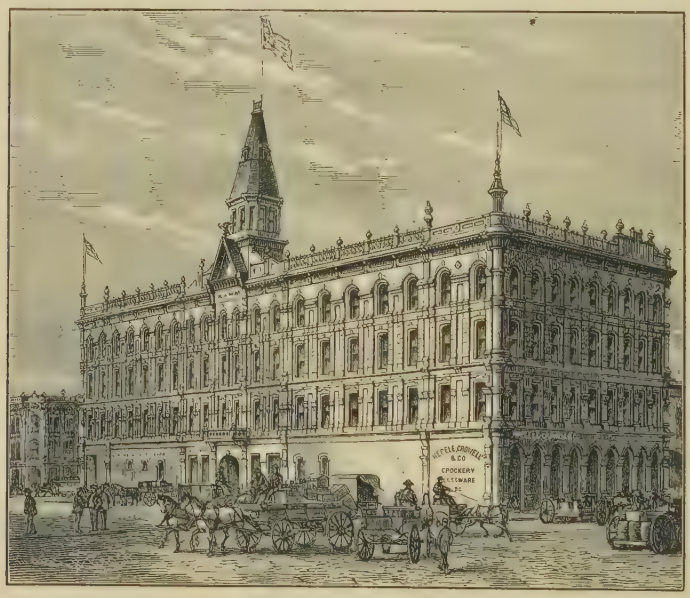
In November, 1843, A. L. Lovejoy and A. M. Overton located claims on the present site of Portland. In the fall of 1844 Overton sold his interest to F. M. Pettygrove for $50; and during the winter following a small log cabin was erected. These two men, Lovejoy and Pettygrove, had an idea that the future city of Oregon would be built upon the site which they had selected. So in July, 1845, they laid off sixteen blocks near the river, making the blocks two hundred feet square, and subdividing them into eight lots fifty by one hundred feet each. Now they must name their



PORTLAND, OREGON.

new town; and Lovejoy, who was from Massachusetts, suggested Boston. Pettygrove was from Maine, and he suggested Portland. They drew lots to settle the question, and Pettygrove won. Hence the name Portland. Before the next winter fairly set in they built of hewn logs a modest little store.

Sometime thereafter both Lovejoy and Pettygrove sold out, the latter receiving $5000 for his share for which he paid Overton $50. Contrasting this very humble beginning with the present appearance of the city, its growth and thrift are truly marvellous. The log store



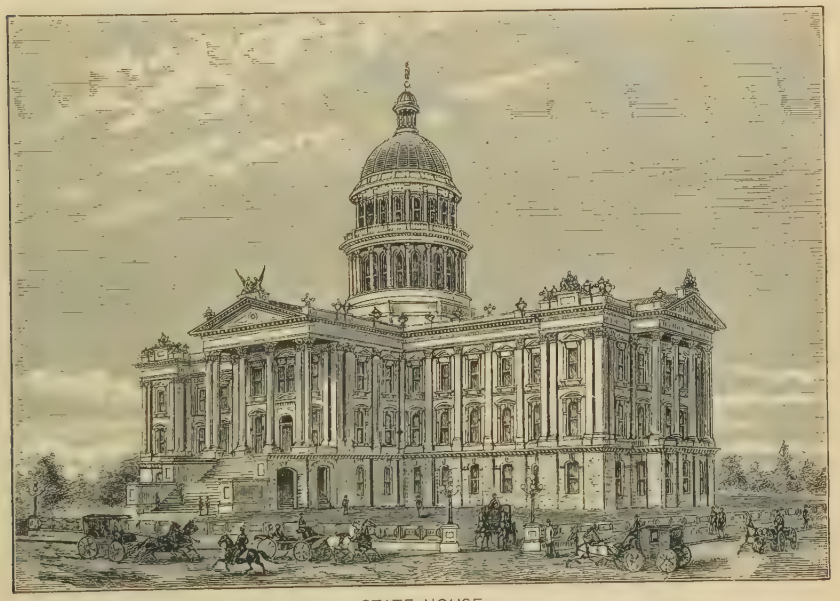
THE KAMM BLOCK.

represents the fact somewhat less than fifty years ago; the other views presented represent the facts *now*. Between the two, what enterprise, industry, thought, labor, trials, and triumphs!

The State of Oregon contains about twelve times as many acres as Massachusetts, and, in many particulars, its future prospects are twelve times as great. In length, from east to west, it is three hundred and fifty miles, and in width, two hundred and eighty miles, embracing an area of 95,247 square miles, or, in round numbers, sixty-one million acres. The business and enterprise of the inhabitants are as large as the State. Proof of this is found in their public buildings.

The State Capitol at Salem is worthy of any of the oldest eastern

commonwealths. It is a very substantial edifice, of ample proportions, and both beautiful and imposing. The edifice not only speaks for itself, but it speaks for the State, whose people take pride in their ability to represent the highest type of civilization. The editor of the *New West* says, "One of the deepest rooted and most erroneous impressions the East entertains of the West is that the towns and cities are all new, illy constructed, poorly provided with the conveniences for health, comfort, and the transaction of business, socially and morally below par, of a mushroom growth, and possessing those peculiar characteristics which have always been associated with the



STATE HOUSE.

'frontier.'" One purpose we have in presenting these views of public buildings to the reader is to correct such incorrect and absurd ideas of the West.

The insane asylum is located at Salem, the capital. It is an ample provision of the State for a very unfortunate class of its inhabitants. The building is large and graceful, supplied with everything necessary for the comfort and cure of the insane — a beautiful expression of the philanthropic and benevolent spirit of the people.

Tacoma, Washington Territory, is the western terminus of the Northern Pacific Railroad and the head of navigation on Puget Sound, and therefore a place of much importance, especially since the construc-

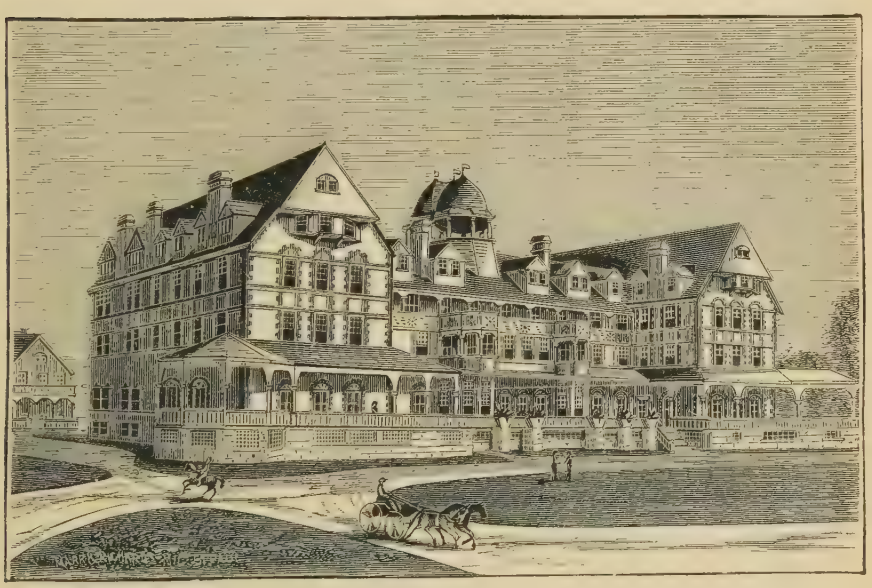
tion of the Northern Pacific Railroad. In March, 1885, the editor of the *New West* said: "In the vicinity of Tacoma, and on several islands contiguous to the mainland, are large areas of splendid potter's clay. A large quantity of machine-made brick are turned out by nine different yards. Of these, fully five millions went into buildings in Tacoma last year, while large quantities were sent to other markets. . . . Tacoma is the county seat and the seaport to which all this region is tributary. Not simply that, but it is the terminus of the Northern Pacific, the point where that great transcontinental line reaches the deep water of the Pacific. Here can come the varied

INSANE ASYLUM.

products of the Inland Empire and the greater portion of Western Washington for shipment, and from here those same regions, soon to be wealthy and populous, can draw their supplies. Here, too, can come the commerce of Asia and the Pacific for transmission across the continent, while to the warehouse here the railroad can bring the innumerable articles sent from the East to be distributed throughout the northwest region."

The "Tacoma" is one of the largest and finest hotels in the West north of San Francisco, a city of magnificent public houses. It was erected in 1884 by the Tacoma Land Company at an expense of $200,000, and has already won a reputation throughout the country. It stands on an eminence above the water front, affording the guests

on the veranda such a view of water, valley, and mountain as few ever enjoyed before. A visitor says of this hotel: "The Tacoma, as a homelike resort, is not an illy constructed idea of its projectors. It is from the designs of a celebrated firm in New York City, and built under its supervision. It is modeled from the domestic architecture of France and Holland of the fifteenth and sixteenth centuries. The main lines of the building are similiar to the same lines in the best of French work, and the gables are a reproduction of a type found very frequently in Holland. The window and door framings and cornices are of selected hard-burned brick, and are attempts at decorating what would otherwise be tame and flat, owing to the



THE TACOMA HOTEL.

necessity of covering all brick walls with cement in this, a damp climate, where the brick are very readily affected. The interior details were studied with a view of making the house attractive as a home, warm and rich in color, and with fine and delicate mouldings.

"The guest here, as he sits in the shade enjoying a temperature which never rises higher than eighty degrees in the summer, is apt to remember his friends at the seashore in the East, or at the interior mountain resorts, and pity them."

Some of the finest business blocks north of San Francisco are found here. The original wooden buildings are being rapidly re-

moved, and substantial brick ones take their places. In the city there are "336 distinct establishments or offices of professional men. These are classified alphabetically as follows: architects, 4; auction houses, 2; attorneys, 38; bakeries, 4; banks, 3; brick-yards, 3; boots and shoes, 4; blacksmiths, 5; barbers, 10; bath-rooms, 3; builders, 7; clothing and gents' furnishing, 3; car and machine shops, 2; cigar stores, 13; Chinese stores, 7; Chinese laundries, 21; doctors, 24; dairies, 4; dry goods, 7; dentists, 2; engineers and surveyors, 9; express offices, 2; flouring mill, 1; furniture dealers, 4; fruit and provisions, 4; fish, 2; flour and feed, 4; foundry, 1; galvanized iron works, 1; general merchandise, 2; groceries, 16; harness makers, 2; hotels, 15; hardware, 3; insurance and real estate, 26; jewellers, 7; livery stables, 3; lock and gunsmiths, 2; millinery stores, 4; meat markets, 7; musical instruments, 3; marble works, 1; mining experts, 2; photographers, 2; paints, oils, and wall paper, 2; plumbers and gas-fitters, 3; painters, 3; queen's-ware, wood, and willow ware, 3; restaurants, 8; saloons, 25; saw and shingle mills, 7; sash and door factories and planing mills, 5; salmon cannery, 1; stationery stores, 4; stoves and tinware, 3; skating rinks, 2; ship carpenters and boat-builders, 4; sewing machine agents, 3; ship chandlers, 1; tailors, 4; toy stores, 1; tub and pail factory, 1; telegraph offices, 3; undertakers, 1; wheelwrights, 2; wagon warerooms, 1."

The St. Luke Memorial Church is a very fine edifice, built of stone, at an expense of $30,000. It was a present to the Episcopal Society from C. B. Wright, Esq., of Philadelphia, formerly president of the Northern Pacific Railroad. His daughter, learning of the struggles of the society to secure a place of worship, resolved to lay aside money enough from her own funds to purchase a bell for them. Before her purpose was accomplished, she sickened and died. One of her last requests was, that her father should see that the bell was supplied. The father responded by this magnificent present. A large memorial window occupies nearly the entire width of the front of the building. This is in memory of the deceased daughter. A marble slab, suitably inscribed, is sunk in one of the walls to the right of the chancel, in memory of Mrs. Wright.

Mr. Wright also endowed the "Annie Wright Seminary" by the gift of FIFTY THOUSAND DOLLARS, in memory of his accomplished daughter. The building was paid for by subscriptions, and cost $35,000. It is a beautiful structure, supplied with all the appliances of the best academies in New England. The inhabitants of Tacoma are justly proud of this institution, it is so much in harmony

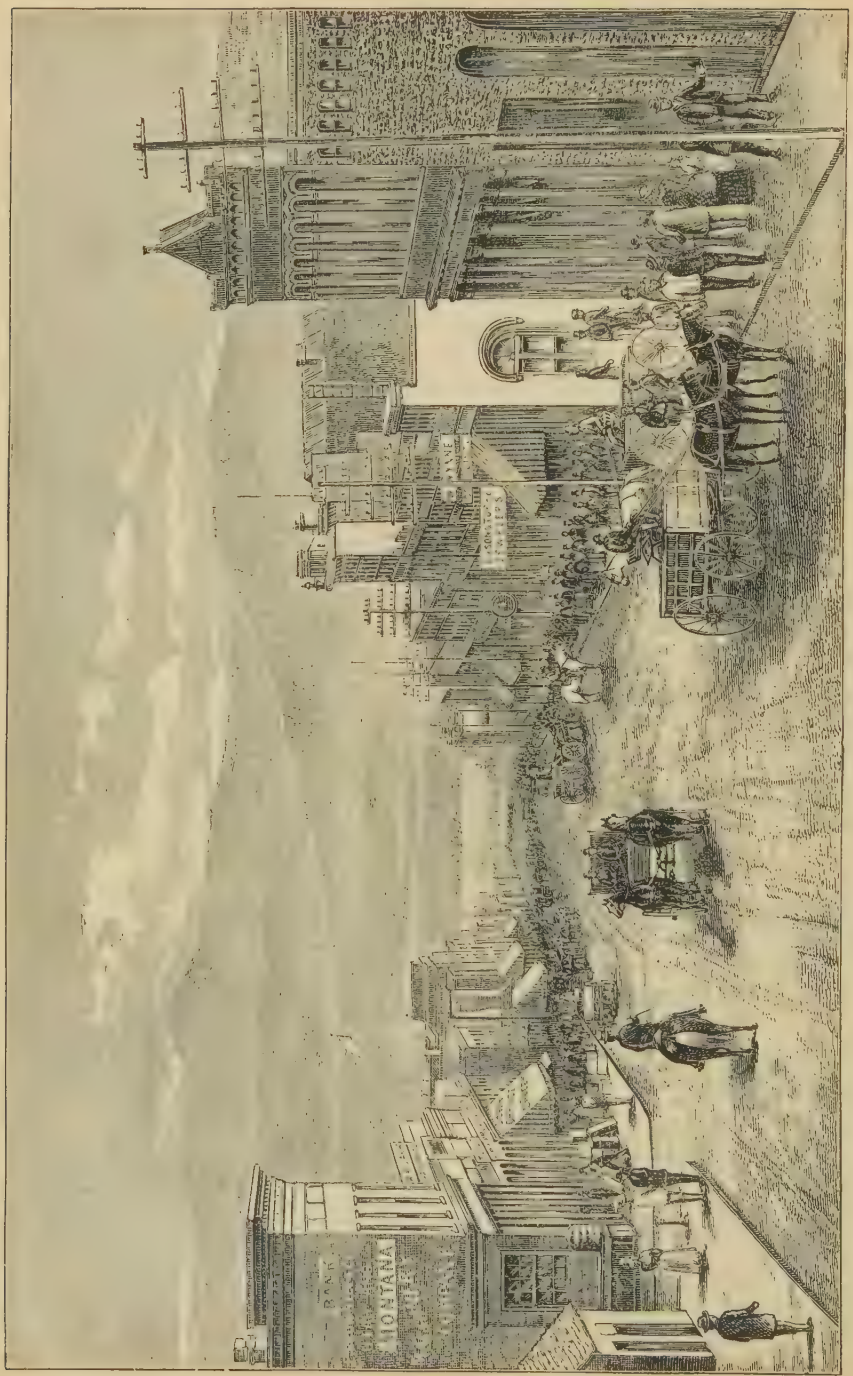
with their intelligent and cultivated taste. They greatly honor the man, too, whose noble bequests have contributed so much to improve and beautify their delightful town.

The citizens of Tacoma have been exceedingly generous in providing public schools. The Central School building is more costly and elegant than the school buildings in New England towns of the size of Tacoma. The grounds, building, and furniture cost $30,000, which speaks well for the enterprise and good sense of a people whom many Eastern dwellers suppose live on the verge of civilization. The rapid increase of the population enlarges the field of educational operations from year to year, imposing heavier and heavier burdens upon the taxpayers, who are not given to grumbling, however, since they fully believe that the best invested property in the city is that which they have put into churches and schools.

The deep interest of the inhabitants of the most distant parts of the New West in public school, is manifest from such facts as the following from the *Advance* of Chicago, a few months since: —

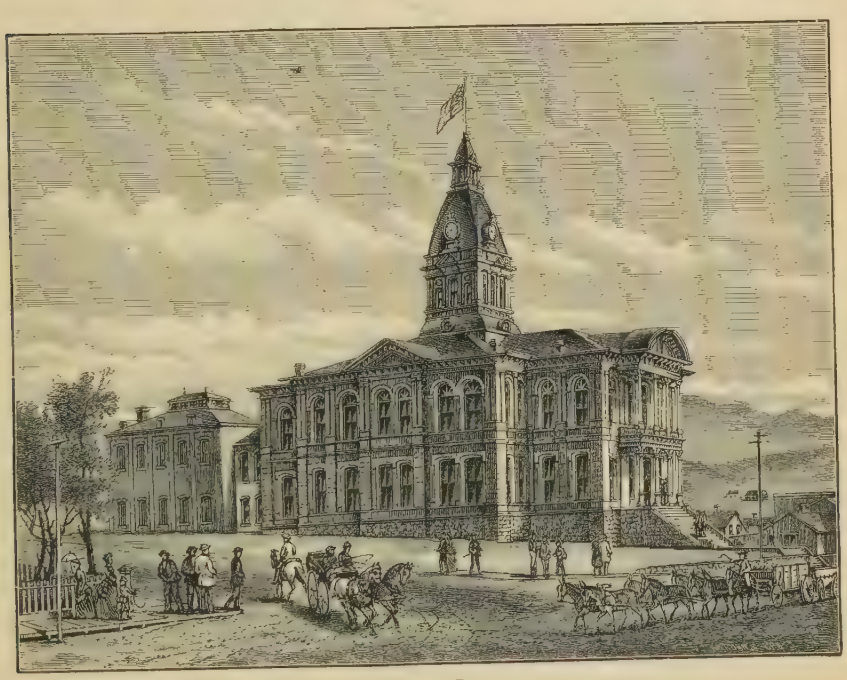
"On one of the thousand islands of Puget Sound, in the centre of eight counties wholly destitute of any higher educational advantages, and having a population of over 16,000, is a little community intensely in earnest in this matter. The people of this island have recently offered us a fine building, well adapted for academy purposes, and twenty acres of land, *provided* we as a denomination will raise an endowment of $10,000, with which to start the school. The money with which to purchase the building is all subscribed, and bond for a deed has been given. The property is worth at least $5,000, and not one of the forty persons who subscribed for its purchase is a Congregationalist; and yet they say to us as a denomination, 'Take the property and give our children the benefit of a good school, that they may not grow up in ignorance.'"

Montana is a newer, if not a wilder country, than Oregon and Washington; and its progress has been unparalleled. To-day it can boast the most promising mining camp in the world, — Butte City, — called "The Silver City," because of its rich and extensive silver mines. It is claimed that Butte is in advance of Leadville, in several particulars, and that the "hard times" which have struck almost every other western town, have never visited this booming place. Since the completion of the Utah and Northern Railroad, the town has advanced from a population of five hundred to twenty thousand, including its environs. The citizens have been moved to true Western generosity, not to say prodigality, in providing everything which



BUTTE CITY.

the business, educational, and moral interests of the city require. Expensive water-works, the electric light, churches, schools, three daily newspapers, with several weekly, telegraph, telephone, and all the etceteras of a thriving Eastern city. Their large and numerous business blocks and public buildings are the best possible proof of the energy, tact, and enterprise, which have reared this and other cities, within a few years, on the frontier. The "howling wilderness" is driven out of Montana.



COURT-HOUSE.

It has the appearance of a busy, bustling Eastern city, though having more dash. The assessment value of its property aggregates $12,000,000. It has eight churches, three banks, schoolhouses that cost $75,000, gas-works, and all the other appointments of modern civilization, although it is so young and situated in the wilderness. The editor of the *West Shore* says: "Law and order are supreme, life and property are secure, and there, as elsewhere, he who behaves himself will not be molested, while he who does not will probably only be interfered with by the police. Socially, Butte contains as large a proportion of educated and refined people as any manufactur-

ing city in the union, a statement to which its many fine churches and schools bear ample witness."

The total bullion shipment from Butte, in 1885, amounted to $5,000,000, and of copper matte, $10,000,000, making a total of $15,000,000.

The cost of the court-house was $150,000, a necessary outlay to meet the demands of the thriving county. It is a fitting monument of the public spirit which pervades the communities on the Pacific coast. They do nothing by halves. Their business is conducted on a grand scale, nothing picayune about it. Here in Butte is the largest smelter in the whole world. It contains over thirty furnaces, which reduce one thousand tons of ore daily, producing one hundred and fifty tons of copper, assaying sixty per cent copper. The machinery is run by water power, though the furnaces consume over a hundred cords of wood daily. The company made one contract for wood amounting to $1,000,000 — THREE HUNDRED THOUSAND CORDS. This copper mine, known as the Anaconda, is the richest copper mine in America.

As large a per cent of the population attend meeting on the Sabbath as attend in a manufacturing village of New England. Their neat and attractive houses of worship show that the citizens place a high estimate upon Christian institutions. The leaders of thought and enterprise appear to understand that their employés need the Sabbath for physical rest and recuperation, as well as for moral improvement. Hence, this generous provision for the moral and spiritual welfare of the masses.

Their public schools are provided with modern improvements, and the teachers employed are among the best whom large pay can secure from the East. In thoroughness of instruction and discipline, the schools of Montana, at least in its leading cities, like Butte, Helena, Deer Lodge, etc., are not inferior to those of Massachusetts. In no part of our country are the people more fully imbued with the idea that permanency of government depends upon the intelligence as well as morals of the governed, than are the inhabitants of the New West. Of course, there is a large class who give no attention to these matters, and doubtless undervalue them; but we speak of the ruling classes, who make the West what it is, and is to be.

A writer says: "Helena, by reason of her own valuable mines, and her favorable situation in regard to other mining camps, became the great mining and commercial centre; by accumulation of wealth, in the hands of shrewd, capable, and energetic men who knew how to

use money to conquer fortune, she acquired complete financial supremacy; and finally, her political influence and commanding situation, gave her the seat of government of the Territory. All of these advantages she still retains, and they will in a few years, when the railroad system of Montana is more fully developed, give her ten times the population and influence she has now, for then Helena will become the railroad centre of this vast region. These are the reasons why she is the political, financial, and commercial capital of Montana, and why she is proudly and lovingly called by all her citizens, 'The Queen of the Mountains.'"

To the general reader, Idaho seems to belong to the outside world far more than Montana. Nevertheless, it is one of the fair, bright spots of the New West, which modern civilization is rapidly transforming into a country worthy of its beautiful name. From a historical statement prepared for the New Orleans Exposition by the Territorial Comptroller, we extract the following account of the origin of its name, which will be read with interest: —

"Idaho is generally supposed to be a corruption of an Indian word meaning 'Gem of the Mountains.' This, however, is disputed. The poet Joaquin Miller, writes as follows on the subject: —

"'The distinction of naming Idaho certainly belongs to my old friend Colonel Craig (since deceased) of Craig's Mountain, Nez Percé County. As for some fellow naming it in Congress — bah! The name was familiar in five thousand men's mouths as they wallowed through the snow in 1861, on the way to Oro Fino mines, long before Congress, or any man of Congress, had even heard of the new discovery.

"'The facts are these: I was riding pony express at the time rumors reached us, through the Nez Percé Indians, that gold was to be found on the head waters and tributaries of the Salmon River. I had lived with the Indians; and Colonel Craig, who had spent most of his life with them, often talked with me about possible discoveries in the mountains to the right, as we rode to Oro Fino, and of what the Indians said of the then unknown region. Gallop your horse, as I have a hundred times, against the rising sun. As you climb the Sweetwater Mountains, far away to your right, you will see the name of Idaho written on the mountain-top, — at least, you will see a peculiar and beautiful light at sunrise, a sort of diadem on two grand clusters of mountains that bear away under the clouds fifty miles distant. I called Colonel Craig's attention to this peculiar and beautifully arched light. "That," said he, "is what the Indians call E-dah-hoe, which

means the light, or diadem, on the line of the mountains." That was the first time I ever heard the name. Later, in September, 1861, when I rode into the newly discovered camp to establish an express office, I took with me an Indian from Lapwai. We followed an Indian trail, crossed Craig's Mountains, then Camas Prairie, and had all the time E-dah-hoe Mount for our objective point.

"'On my return to Lewiston I wrote a letter containing a brief account of our trip and of the mines, and it was published in one of the Oregon papers, which one I have now forgotten. In that account I often mentioned E-dah-hoe, but spelt it Idaho, leaving the pronunciation unmarked by any diacritical signs. So that, perhaps, I may have been the first to give it its present spelling, but I certainly did not originate the word.'

"A writer in the *New West* apparently well informed, declares that Idaho is not a Nez Percé word, adding: 'The mountains that Joaquin Miller speaks of may be named with a somewhat similar appellation, but most likely the whole story grows out of the fertile imagination of the poet. Idaho Springs, in Colorado, were known long before Idaho Territory was organized. The various Territories at their organization should have been given some appropriate local name. Colorado was named after the river of that name, though it is not within its boundaries. It should have been called Idaho. It was the name first placed in the bill organizing it, but which was afterward changed.'

"William H. Wallace, the delegate to Congress from Washington Territory, who introduced the bill making a new territory out of the eastern portion of Washington, pleased with the beauty of the name of Idaho, suggested it as an appropriate one.

"Ex-Senator Nesmith of Oregon gives still another account: 'The bill first passed the House of Representatives designating the present Territory of Idaho as "Montana," when it came up for consideration in the Senate on the 3d of March, 1863. Senator Wilson of Massachusetts moved to strike out the word "Montana" and insert "Idaho." Mr. Harding of Oregon said: "I think the name 'Idaho' is preferable to 'Montana.'" Idaho in English signifies "the Gem of the Mountains." I heard others suggest that it meant in the Indian tongue "Shining Mountains," all of which are synonymous. I do not know from which of the Indian tongues the two words "Ida-ho" come. I think, however, if you will pursue the inquiry among those familiar with the Nez Percé, Shoshone, and Flat Head tribes, that you will find the origin of the two words as I have given it above.'"

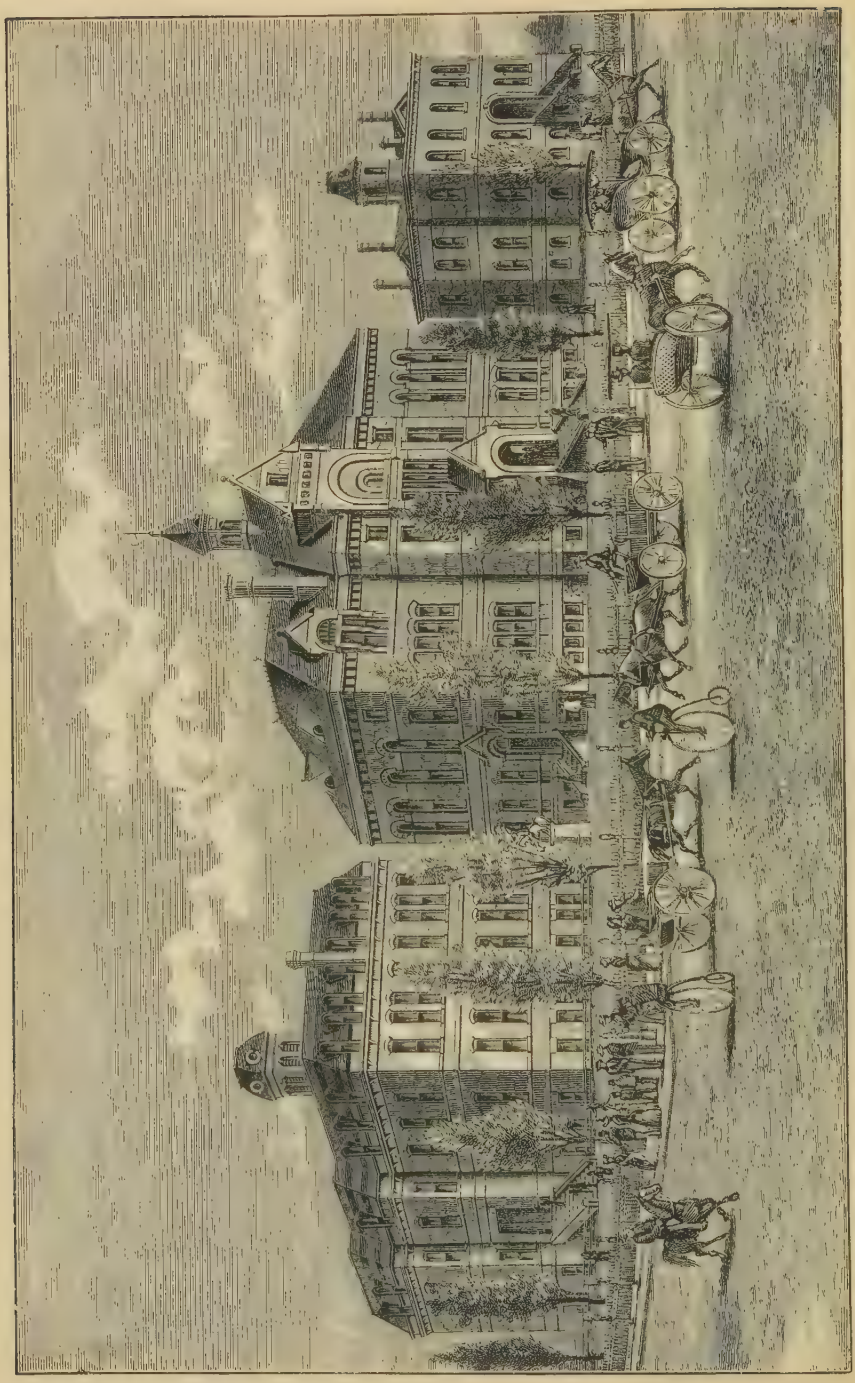
Boise City was two hundred and fifty miles from the nearest railroad station until seven years ago, and could be reached only by a long and wearisome journey by stage or team for days and nights. To travellers it was a desolate region, through which they journeyed to reach the little thrifty city which pluck and enterprise had reared at the mouth of Boise River, from which its name was derived.

The business part of the town is built of brick and stone, a city ordinance prohibiting the erection of wooden buildings. A business of more than $200,000 monthly is done by the citizens. There are three excellent hotels, more than twenty stores of all kinds, and

BOISE CITY.

three newspapers, — two of them weekly, and the other tri-weekly. The streets are wide, and so shaded with trees as to appear beautiful beyond comparison. Hence the name by which the place is known, — "Wooded City."

One of the writers already quoted says: "There is land enough in the neighborhood for all who choose to come. The history of the past twenty years of this valley shows what energy and determination can accomplish in the face of almost insuperable obstacles. With these obstacles now removed, and with the valley easily accessible by rail to the immigrant seeking a home and the capitalist an investment for his money, the growth of the next few years must be far greater and more marked than at any period in the past. Boise valley



CAPITOL SQUARE.

proper is about sixty miles long and from two to six wide, containing two hundred thousand acres of good arable land. Wherever this has been brought under cultivation by means of irrigating ditches, the most wonderful results have been obtained."

In the centre of the cut opposite the capitol is seen. This elegant structure was erected at a cost of *eighty thousand dollars!* On the right is the court-house, which cost $70,000. On the left of

CENTRAL SCHOOL BUILDING.

the capitol is a public-school building, four stories high with mansard roof. It is a brick structure, eighty-two by one hundred feet, and cost $50,000. One who knows says: "The school system is the pride of the city. It is thoroughly graded, has a principal and six assistant teachers, and is in such high favor, and does its work so satisfactorily that no private schools are maintained, though there are more than seven hundred children of school age in the district.

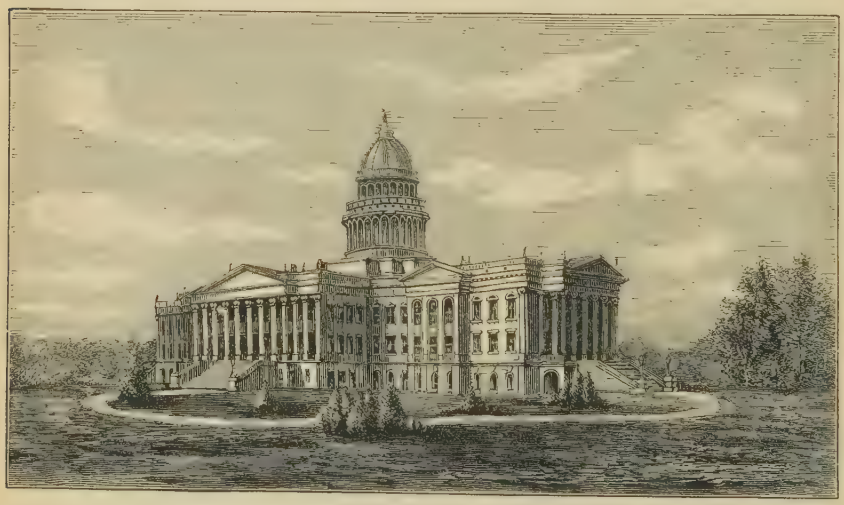
Many families from a distance reside in the city for the purpose of giving their children those excellent educational advantages."

Such a place in far-away Idaho, where a few years ago the adventurer would go to be scalped, but not to be educated! A marvel, indeed, is such a change.

On Line of U. P. Railroad.

FIRST CAPITOL OF KANSAS.

There was but one house in Cheyenne, Wyoming, on the fourth day of July, 1867. In the spring of 1869 there were six thousand inhabitants. The construction of the Union Pacific Railroad awakened latent powers of progress and set all of its machinery in motion. This population of six thousand embraced scores of irresponsible men, who moved forward with the road, leaving the more substantial element to build up an orderly and thriving town. Still, Cheyenne suffered for a time by the presence and depredations of "roughs," who frequented gambling hells and dance halls, until the best citizens, satisfied that



LAST CAPITOL.

stringent measures only would relieve the town of this vicious class, rose in their might and appointed a vigilance committee, who suspended several of the most desperate fellows by the neck from trees or other elevations. Their accomplices made a personal application of the hint, and departed for "parts unknown," from which time Cheyenne has been one of the most quiet and flourishing young cities on the

line of the Union Pacific Railroad. We show, on page 349, one of its three fine schoolhouses.

The growth and enterprise of Cheyenne were not dependent upon the discovery of gold mines, as was the case with Leadville and other mining towns; but it was the outgrowth of that western public spirit, which found occasion for development in the construction of the Union Pacific Railroad. There are many other towns of equal thrift which have sprung up in the same way, leading the best New England communities now in magnitude of business, the excellence of their schools, and the general progress of public affairs. But for our limited space we should make special mention of other towns.

Public enterprise in Kansas is of a high order. The effect of it is seen in every department of social and public life. It pushes agriculture, manufactures, the mechanic arts, science, learning, and religion. The public buildings of no State in the Union are more expressive of enterprise than those of Kansas. We are able to furnish the reader with a correct illustration of the first and last capitol of the State (p. 350).

GUNNISON IN 1879.

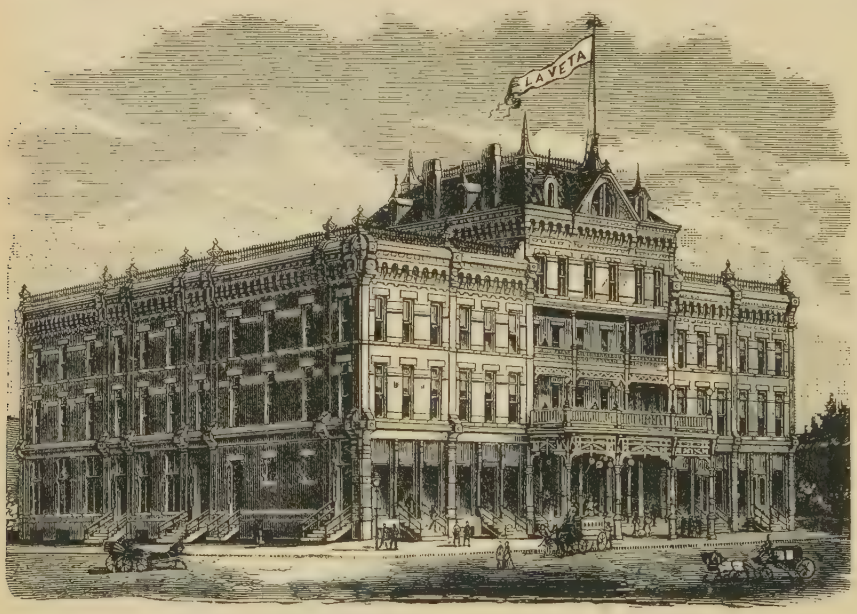
By contrast these two capitols show the rapid progress of its intelligent population, in art, science, business learning, and all that goes to develop a great Commonwealth.

At Gunnison city, on the Pacific Slope, where there were but six or eight cabins in the spring of 1880, we found a population of three thousand in the autumn of 1883, with a system of graded schools, including high school and superintendent of public schools. The town had sixty thousand dollars invested in school property at that time. Three years seemed to be ample time for this thriving, driving community to accomplish what would require ten years to do in New England. The following cut represents the best hotel of the city, built and furnished at a cost of TWO HUNDRED AND FIFTY THOUSAND DOLLARS.

One who knows sends us the following: —

"At the confluence of the Gunnison and Tomichi rivers, on the western slope of the Rocky Mountains, there is a broad level valley, surrounded by mountains which present the most beautiful and pic-

turesque autumnal landscapes imaginable. On the side of one of these mountains in bold relief is outlined the profile of a human head, and legend tells us that the Indians used to make annual visits to this valley to worship the Great Spirit. In 1879 the habitations of this valley consisted of the little log-cabin shown in the illustration, and a few tents; but about this time the reports of the fabulous mineral wealth of the great Gunnison country began to be noised abroad, and soon the mountains were filled with a fickle horde of fortune-hunters, and mining towns with populations of one to three thousand sprang up in a few months. This beautiful valley seemed the natural



LA VETA HOTEL, GUNNISON.

place for the 'Gate City' of this great Eldorado, and in March, 1880, Gunnison was incorporated with forty voters. By the middle of 1881 her population had grown to over five thousand; the Denver & Rio Grande Railway had gotten into the country and began to develop the vast coal fields near by.

"The superior quality of this fuel, and the abundant resources of all other essentials, in such close proximity to Gunnison, soon attracted the attention of capitalists, and convinced them that there must, ere long, flourish one of the greatest manufacturing cities in the West. This faith led to large permanent investments which have put Gunnison beyond the uncertainties of most Western towns.

"Prominent among these investments may be noted that of a company of wealthy St. Louis gentlemen, who, through their efficient manager, Mr. D. J. McCanne, expended, during the year 1882, nearly half a million dollars in the erection of fine water and gas works, and the palatial La Veta Hotel. To the nerve and enterprise of these men in making these magnificent improvements, much of Gunnison's future depends. These same gentlemen have since invested a quarter of a million in the erection and operation of large reduction works there, which are now in successful operation.

"Gunnison has lost a large portion of her shiftless floating population, but retains most all her substantial citizens, who are so attached to her climate, her fine schools, and her refined cultured society, that they could not be long satisfied away from her. The wealth and permanency of her resources are now being rapidly developed, and within a few years she will become a prominent city of the western slope. To the capitalist, the sportsman, the pleasure-seeker, or the invalid, Gunnison's attractions are rare."

The same correspondent also writes: —

"Among the many wonderful resources of the great Gunnison country, there are none that excite a livelier interest, from a commercial standpoint, than the wonderful deposits of coal and iron ore which are found there.

"About forty miles east of Gunnison are found several fine deposits of hematite iron ore, one of which has been developed to a depth of fifty-three feet, showing solid iron of remarkable purity, carrying 69 per cent metallic iron, 2.30 per cent silica, 0.116 per cent sulphur, and 0.008 phosphorus.

"Within thirty miles of Gunnison, in the same direction, is found a deposit of manganese ore, of which Regis Chauvenet & Brother, metallurgists and chemists, of St. Louis, Mo., say: 'We consider this an excellent ore for the manufacture of "spiegel" iron, since it yields iron 27.47, and manganese 17.90. This is a ratio which will yield a high "spiegel," probably 1.30 per cent of manganese; and it is well known that no artificial mixture will work as well as an ore with the proper ratio of the two metals. The low phosphorus, 0.059, is especially noteworthy.'

"The most wonderful deposit of iron ore in the West, is found about twenty-five miles southwest of Gunnison, on the proposed railroad route from Gunnison to Lake City. After a careful survey of this territory, a prominent iron manufacturer of St. Louis expressed his belief that there is more iron there, within a radius of five miles,

than there is in the State of Missouri, and that the facilities for manufacturing it cheaply would place this iron in competition with eastern and southern iron as far east as the Missouri River, and exclude all other iron west of the Rocky Mountains, to the Pacific coast.

"The great variety of ores found in this district, comprising hematite, specular, magnetic, black oxide and manganese ores, all high in metallic iron, and remarkably free from silica, sulphur, and phosphorus, and the easy access and facilities for cheap mining and transportation, and the close proximity of abundance of the best fuel, makes this one of the most attractive iron deposits to be found in the United States.

"Underlying Mount Carbon and Mount Wheatstone, fifteen to thirty miles north of Gunnison, and covering an area of over three hundred thousand acres, are five seams of as fine bituminous coal as can be found in the United States. These seams vary from three to ten feet in thickness, and aggregate thirty feet; they are opened, and most of them are extensively developed. Two of these seams, one ten and the other six feet in thickness, make coke of the finest quality, yielding 90.71 per cent fixed carbon, 8.67 per cent ash, and 0.37 per cent sulphur. The coke yield of this coal is 75.76 per cent of the weight of the coal. This coking coal is also an exceptionally fine gas coal. Mr. D. J. McCanne, superintendent of the Gunnison Gas and Water Company, is authority for the statement that his yield from this coal, used alone, is nearly six feet of sixteen-candle gas per pound of coal.

"The other seams yield an average of 55 per cent fixed carbon, 33 per cent volatile matter, and 4 per cent ash. One of these seams has been covered with a lava capping, the heat and pressure of which has converted it into a semi-anthracite, rendering it peculiarly adapted to iron manufacture in its raw state. This coal, covering an area of over six hundred acres, lies within fifteen miles of Gunnison.

"Lying further north, a distance of twenty-five to forty miles from Gunnison, is a large area where these same coal measures have been broken up and subjected to heat, leaving here and there, large deposits of anthracite coal of very superior quality, yielding 98.76 per cent fixed carbon and 2.27 per cent ash. This anthracite, so far as now developed, covers an area of about ten thousand acres; but there is little doubt that systematic drilling will develop all the other seams, as only two of the five are so far discovered.

"These coal lands are all accessible by rail and have been extensively developed. There was shipped during the year 1886, fifty-one

thousand tons of bituminous coal, thirty-two thousand tons of coke, and eighteen thousand tons of anthracite.

"Still farther north, but less accessible, are found more wonderful deposits of coal, — anthracite, bituminous, and coking, some of the seams being sixteen feet in thickness. A large body of this coal is held by the Cunard Steamship Company; other syndicates control large tracts.

"But the great bulk of this coal and iron land is yet held by the original locators, and can be secured at a small advance above the government price, which is twenty dollars per acre."

The most marvellous growth of modern times, however, is the city of Denver, Colorado. In 1858 there were only a few tents and huts on the spot where the city now stands. Less than fifty people were there through the winter of 1858–59, drawn thither by the discovery of gold. A barren waste was all that met the vision in every direction at that time; for it was the "Great American Desert," which spread out from the Missouri River to the Rocky Mountains, — the home of the buffalo and the hunting-ground of the Indian. At the banquet of "Pioneers" in Denver, Sept. 13, 1883, — an association of men who settled in Colorado previous to 1861, — Governor Steele, who was one of the members, said: —

"I landed in Denver on the 4th of May, 1859. There was nothing but tents and cabins about here. We had fought our way against the current that had turned back, who told us the country was a barren land; that we would starve to death; that Green Russell had not found anything; and that the reports we had heard were lies. We dared not oppose them, nor declare that we intended to come on to the end, because they were so determined not to allow any one to sacrifice himself, as they called it, that they were ready to mob and hang us if we did not yield. We had to steal away from them in order to go on."

No persons are more amazed over the growth of Denver, and, indeed, the whole New West, than the "Fifty-niners" (as they have been called), who struck fortunes when they struck the junction of Platte River and Cherry Creek.

What do we see now where these pioneers pitched their tents or reared their humble cabins? The largest, richest, and most beautiful city of its age on earth, — a sparkling, costly jewel on the bosom of the "desert." Where less than fifty people wintered in 1858–59, *one hundred fifty thousand* now dwell, — as intelligent, enterprising, and generous a population as can be found in New England. The city is

handsomely laid out, with wide avenues lined with shade-trees, and beautified with irrigating rivulets; large and costly warehouses and public buildings; street-cars; the electric light; water-works; elegant churches; newspapers, and schools unsurpassed by those of Boston; telegraph, telephone, and railway facilities; in short, everything necessary to promote the growth of a marvellous city, which may contain, in the year 1900, a population of two hundred thousand.

"Beautiful for situation" is Denver, though founded on a "desert"; for that "desert" has been made "to blossom as the rose." The Rocky Mountains rise grandly to view along the entire western horizon. The vision takes in the snow-capped summits for one hundred and fifty miles. On the north, "Long's Peak" lifts its tall form, and to the south, Pike's Peak towers skyward, with the "snowy range" between, presenting a landscape which challenges brush and pencil.

The business of the city is immense. The last Report of the Chamber of Commerce shows that the business of 1890 amounted to ($213,347,745) *two hundred thirteen million three hundred forty-seven thousand seven hundred forty-five dollars. The receipts of the post-office for the same time, including money-order receipts, were* ($5,980,559.26) *five million nine hundred eighty thousand five hundred fifty-nine dollars and twenty-six cents. Net profits to the government,* ($184,287.27) *one hundred eighty four thousand two hundred eighty-seven dollars and twenty-seven cents. The money-order receipts amounted to nearly three million dollars.*

The Report claims for the city eleven National Banks, three Savings Banks, and one State Bank, with a combined capital of $7,600,000. There are, also, several private banking houses. The deposits or accumulated funds of and in the banks amount to TWENTY MILLION DOLLARS. The President of the Chamber of Commerce says: "The city's building operations amounting to $16,541,625 during the year, the realty sales reaching the enormous amount of $65,500,000, the wholesale jobbers' trade showing $38,370,456; the manufacturers' output $44,072,802, the bank clearings aggregating $255,599,001, — all figures showing a great advance over those of 1889; the fact that the internal rapid transit facilities have been largely extended, affording over one hundred miles of electric, cable, and motor lines, together with the magnificent exhibit made in the growth of Denver's immediate suburbs, do not manifest other than a year of great prosperity." The total insurance of the city in 1890 amounted to ($75,000,000) seventy-five million dollars, and losses by fire were only ($257,382.00) two hundred fifty-seven thousand three hundred eighty-two dollars.

There are twelve cities in the United States whose population exceeds 100,000 and is less than 200,000. Denver is better built, has a lower rate of taxation, a smaller public debt, greater security from fire, greater street-car facilities, with better equipment and service, more schools and churches, than any of these.

In 1890 over sixteen thousand persons purchased real estate in Denver, to the value of more than sixty-five million dollars. In the same period the value of real estate increased over sixty million dollars.

Denver hotels can accommodate twenty-five thousand persons at one time. Its one hundred and fifty artesian wells yield over three million gallons per day. The building of its Young Men's Christian Association cost two hundred and fifty thousand dollars, and its Masonic Temple three hundred and fifty thousand.

We have spoken of Denver as the wealthiest city of its size in the world. Mr. M. G. Mulhall, the celebrated Irish statistician, has recently published the following in the *North American Review*: —

"In 1830, Great Britain had a population of 24,000,000, and capital amounting to $16,890,000,000; in 1850, 27,200,000 population, and $25,800,000,000 capital; in 1870, 31,300,000 population, and $35,400,000,000 capital; in 1884, 36,200,000 population, and $45,300,000,000 capital. France had, in 1830, 32,100,000 population, and $10,659,000,000 capital; in 1850, 35,700,000 population, and $15,850,000,000 capital; in 1870, 37,800,000 population, and $26,200,000,000 capital; in 1884, 38,200,000 population, and $41,200,000,000 capital. The United States had, in 1830, 12,900,000 population, capital not given; in 1850, 23,200,000 population, and $8,430,000,000 capital; in 1870, 38,600,000 population, and $35,370,000,000 capital; in 1884, 55,500,000 population, and $51,670,000,000 capital. That is, in fifty-four years Great Britain has almost trebled her wealth, France has nearly quadrupled hers, and the United States has seen its capital multiply more than sixfold."

We quote these facts for the purpose of saying that Denver has far outstripped even the "sixfold" growth of the United States in fifty-four years. In thirty-two years it has advanced from nothing to *seventy millions.*

Broadway, New York City, does not present more enterprise, stability, and rush, than we behold in Larimer Street, bating the difference in magnitude. Eastern solidity, tact, and forethought seem to be mixed up with Western dash, in about equal parts. The result is a bustling, thriving, inspiring scene. It is worthy of note, as proof of marvellous progress, that thirty-two years ago, where Larimer

Street crosses Cherry Creek, two flattened pine logs with a rough board railing, formed a foot-bridge from bank to bank; and at this point, a flour barrel sunk supplied the inhabitants with water. This slight convenience for supplying water, contrasted with the present water-works in the city and one hundred and fifty artesian wells, exhibits a change almost incredible.

A pictorial representation of such a city will furnish a better idea of the character of its people and business than any verbal description. The first object which surprises the tourist on reaching Denver is the "Union Depot."

UNION DEPOT.

The Union Depot is a magnificent structure, — substantial, commodious, and elegant. It stands at the foot of Seventeenth Street, and is *five hundred and three feet* long and *sixty-nine feet* wide. A tower adorns the centre of the building, rising gracefully to the height of *one hundred and sixty-five feet.* It is built of Colorado stone, with the exception of the pillars of the arches.

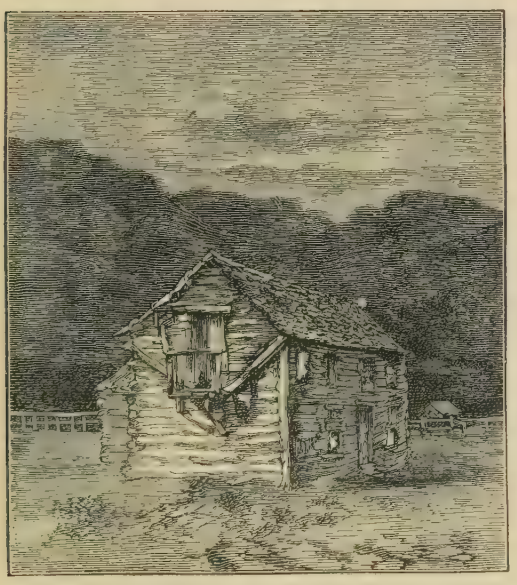
On the ground floor, at the west end, is the baggage-room, ninety by sixty-two feet in size, provided with every modern improvement for handling baggage. On this floor, too, are two spacious waiting-rooms for ladies and gentlemen, large dining-hall, ticket office, Pullman ticket office, express offices, barber shop, etc.

The second floor contains fifty-six offices, occupied chiefly by the

Union Pacific Railway Company and the Denver and Rio Grande Railway Company for the transaction of their immense business.

The building is heated by steam, three large boilers in the basement doing the work, and, at the same time, pumping water to all parts of it. It is lighted by gas and the electric light. An artesian well, sunk at an expense of *three thousand dollars*, supplies the depot with one hundred and thirty thousand gallons of water every twenty-four hours.

Beautiful grounds and driveways surround the building, adorned with fine shade-trees and four fountains, adding an indescribable charm to the spot. The depot cost *five hundred thousand dollars.* It is estimated that nearly *one million* passengers came in or went out of this depot in 1890. In the same time nearly five hundred thousand pieces of baggage were handled. All this, where less than forty years ago there was naught but a desert waste!

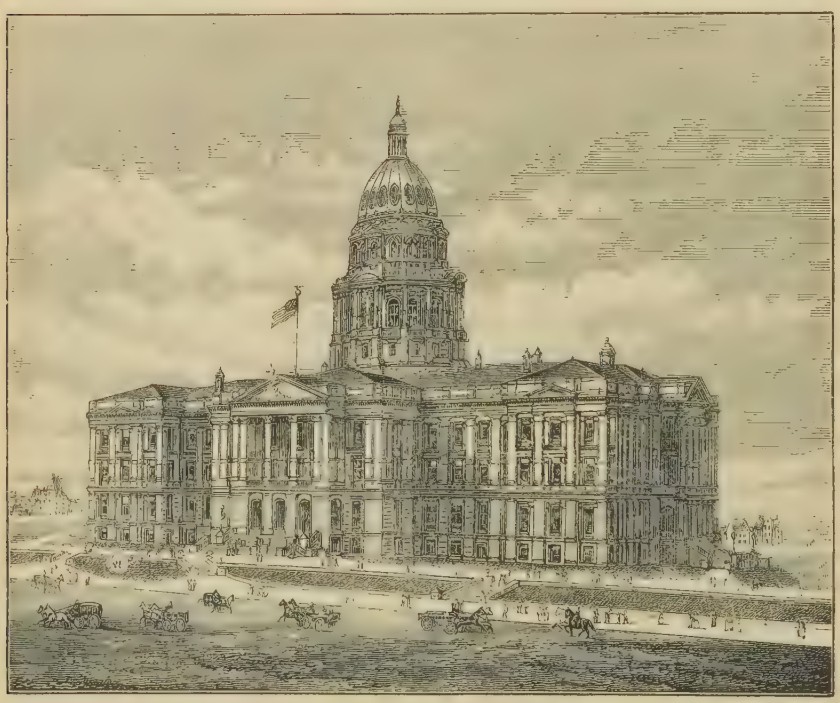


FIRST CAPITOL OF COLORADO.

A Denver newspaper says: "As a sample how Denver men travel to distant and divergent points, a recent day's sale of tickets at the city office of the Union Pacific were aptly illustrative. Agent C. H. Olmsted sold tickets to California, Florida, New York, Alaska, England, and Sweden. He also had inquiry for a ticket, which will probably soon be called for, via San Francisco, China, Suez Canal, and England to New York City. Alaska is a distant portion of the United States, and yet, by taking emigrant railway and steerage steamship rates, the journey can be made for seventy-five dollars, while first-class fare costs only one hundred and twenty-eight dollars. To Sweden the cheap rate is sixty-four dollars and seventy-five cents, but coming this way to Denver only forty-seven dollars, while first-class fare is about one hundred and ten dollars. An agent of a city ticket-office here is

obliged to keep a globe handy for reference to study out the lines of travel desired by residents of Denver."

The State House of Colorado, situated on Capitol Hill, Denver, ranks among the finest structures of the kind in the United States. It was erected at a cost of nearly *three million dollars*. The building is two hundred and ninety-five feet long, exclusive of portico or steps; its depth at the centre is one hundred and ninety-two feet, and its height is three hundred and twenty-six feet, one-third higher than



LAST CAPITOL OF COLORADO.

Bunker Hill Monument. It is surmounted by a statue of Colorado. The statute under which the splendid edifice was reared gave the builder four years in which to do his work, or until Jan. 1, 1890. One thousand car-loads of cut stone, eleven million brick, and four million pounds of iron were wrought into the structure. The roof is covered over with half-inch slate fastened by brass screws and bedded in concrete. Every window is of thick plate-glass, and the interior richly finished in hard wood.

This very brief description of the Capitol, together with the above illustration of it, will enable the reader to appreciate its beauty and

grandeur, compared with the first Capitol. Standing as it does upon an eminence that overlooks the city, its effect upon the traveller approaching the metropolis is inspiring. It is a crown of glory to Denver; and it will proclaim to future generations of Coloradoans the noble aim and enterprise of the present.

The nine lots on which the Tabor Grand Opera House is erected cost about *sixty thousand dollars*, which is pretty well for so small a slice of the "American Desert." The building has a frontage on Curtis Street of two hundred and twenty-five, and one hundred and twenty-five feet on Sixteenth Street. It is in the Queen Anne style of architecture, five stories high, with finished basement. The material is Golden pressed brick and Manitou white sandstone trimmings. The partition walls are all of brick. The mansard roof is covered with slate, and the cornice and trimmings of galvanized iron. The building is surmounted with three towers, the main one at the corner of Sixteenth and Curtis Streets. The height of the grand tower, from the pavement to the top of the finial, is one hundred and fifty feet. On the Curtis Street front, at the third story, are three stone balconies of ornamental design. The windows are very numerous, and are of the twin or triple order. Two large rooms on the ground floor, each twenty-five feet wide, and one hundred feet deep, are occupied by the post-office. Each story above contains one hundred and twenty-five rooms, all *en suite*. To these three stairways lead. The Opera House is in the west corner of the building. The first object that attracts attention at the main entrance is the great white marble step. Standing on this, immediately overhead, is a stone portico two stories in height, of very ornamental design, supported by two gray granite pillars, two feet six inches in diameter, and twenty-eight feet high. The capitals of these pillars are elaborately carved. The entrance proper is a great archway of Manitou stone, eighteen feet wide and twenty-eight feet high, supported on granite pilasters. Passing through the immense folding-doors, the hallway is reached, which is twenty-four feet wide, and fifty-four feet deep. The floor of the hall is paved with Minton tile,

TABOR GRAND OPERA HOUSE.

diamond in shape, and of divers colors. The walls are wainscoted in alternate panels of white and gray marble, the ceiling is beautifully frescoed, and the walls above the wainscoting finely decorated. We have not space to describe the beauty and elegance of the interior construction, and can only add that the building is supplied with artesian water. The building cost eight hundred and fifty thousand dollars.

WINDSOR HOTEL.

This is a magnificent structure, — the finest hotel in Denver, — opened in the summer of 1881. It cost, including land, three hundred and fifty thousand dollars. It is located on the corner of Larimer and Eighteenth Streets. The building covers a space of two hundred by one hundred and twenty-five feet, with a court thirty-seven by ninety-four feet in centre, lighting and above the basement,

which latter is devoted to airing the interior rooms. There are five floors, the steam, washing, and general storage departments. The main entrance is in the centre on Larimer Street, with the ladies' entrance on Eighteenth Street. There are eight single stores and one large double corner store on the ground floor, besides a reading-room and a barber shop, all opening into the corridors of the hotel, in addition to the street entrances. The public office, with coat rooms and lavatory, are in the centre, with the billiard and bar rooms adjoining. The grand dining-room, forty-four by eighty-four feet; ladies' ordinary, thirty-seven by sixty-two feet; club room; nurses' and children's dining room, twenty by forty feet; with the three public parlors and guests' private rooms on the two fronts, are on the second floor. There are about sixty rooms on each of the floors above, making in all about two hundred and twenty-five rooms, aside from the public rooms, singly and *en suite*, with mantels and wash-bowls, and those fronting on the two streets have private bath-rooms attached. There are two easy and commodious landing staircases in addition to the private and servants' stairways. The corridors, extending entirely around the building, are wide and well lighted.

An Otis steam passenger elevator, with every known safety device and appliance, completes the appointments of a public house second to none in Eastern cities. The hotel is supplied with artesian water. It is furnished throughout in the most elegant style of modern art.

There are several other large, first-class hotels in the city, less elegant than the Windsor, but equally well arranged for the comfort of guests; while one or two score of smaller ones, with more modest prices, receive their full share of patronage. Some idea of the immense number of guests in the city may be learned from the fact, that, for several years past, the annual arrivals at the hotels have exceeded *four hundred thousand.* It has been difficult to provide accommodations for travellers, so great has been their influx; and it speaks well for hotel proprietors, that they have not taken advantage of these circumstances, and charged higher prices than prevail in Eastern cities.

The schools of Denver, and, indeed, of Colorado, excel those of Boston and Massachusetts in some particulars. Nor would the author limit this remark to Colorado. No better public and private schools are found in the East than are found in all the older portions of the New West. Adopting the best elements of the Eastern school system, tested for years, and adding thereto the latest and best improvements suggested by leading American educators, the friends of

education in the New West may well challenge the criticisms of New England. But the schools of Denver are exceptionally excellent, and its school-buildings are more complete than even those of Boston. The late Dr. John D. Philbrick, for many years the accomplished superintendent of Boston schools, and one of the most experienced and reliable educators of the country, visited the schools of Denver in the spring of 1882, and devoted several weeks to a systematic and thorough examination of them. He says: —

"In the first place, the schoolhouses were visited while occupied by the pupils, and their qualities — mechanical, economic, hygienic, and pedagogical — noted in detail, 'from turret to foundation-stone.' Mr. Superintendent Gove then, with documents in hand, went over to me, at great length, the organization and practical management of the system with respect to administration, supervision, instruction, and discipline. Thus instructed, I applied myself to the inspection and examination of the classes in the schoolrooms, beginning with the lowest Primary, and ending with the graduating class of the High School, in hands of Mr. Principal Baker. In this survey, I observed carefully the methods of teachers, the proficiency of the pupils, and the spirit in which teachers and pupils were working for the ends in view. Finally, I had the privilege of meeting the teachers in a body, and of conversing with a considerable number of them.

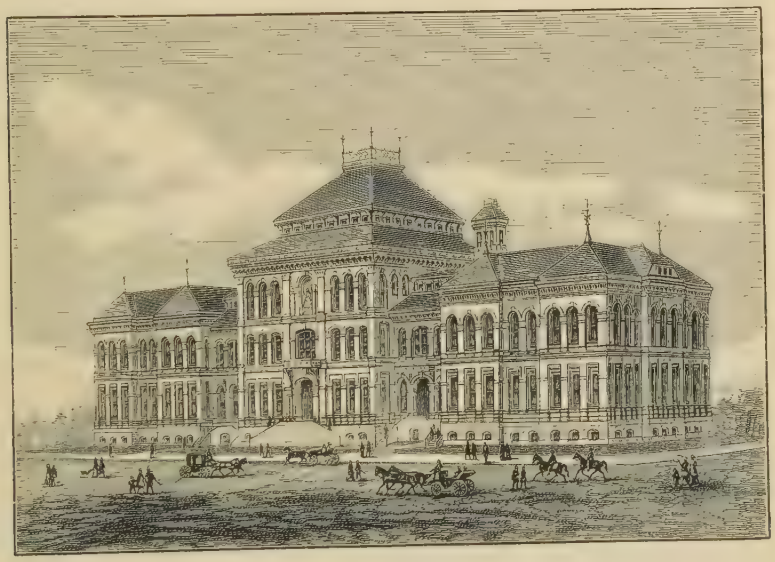
"The result may be summed up by saying that I found the Denver school system to be admirable in all respects. Although its origin dates back scarcely more than a decade, its development has been so wisely and energetically conducted that already it fairly belongs to the front rank of city systems. It is pretty safe to say that the creation of a system of schools on so large a scale, of such exceptional merits, and in so brief a space of time, is a phenomenon to which the history of education affords no parallel.

"How to get good teachers and to keep them is at once the most difficult and the most important problem in the whole range of school economy. And it is but just to the members of the Denver Board of Education to say that they have grappled with the problem more successfully than any other school board within my knowledge. I found by examining into the matter that the happy results attained in this direction were due largely, and perhaps chiefly, to the rational mode of examination adopted and the plan of appointments, by which favoritism is absolutely excluded, and the choice is determined by merit alone."

We should be glad to quote the whole of Dr. Philbrick's remarks,

but the foregoing are sufficient to justify our praise of Denver schools; and the following concerning the school-buildings of the city pronounces them superior to those of Boston, or any other city or town in the country: —

"The schoolhouses of Denver reflect the highest credit upon the school officials who are responsible for the plans, and the liberality of the citizens in furnishing the fund for their erection. These are all handsome and substantial structures, well located on lots of ample dimensions. As to cost, they are truly models of a wise economy. Every schoolroom is first-class in every respect. The corridors and



HIGH SCHOOL.

stairs present some original features of no little merit. The American schoolhouse, which the French Commission to our Centennial considered our best model, has schoolrooms of the first order, but the corridors are dark and badly ventilated, and the stairs are unsatisfactory. It is only just to say that Denver has been more successful in remedying these defects so general in our school architecture than any other city that I have visited, and I know of no city that has better accommodations for all its schools."

In February, 1879, the United States government presented the whole block one hundred and forty-three to the city, on condition that a school-building should be erected upon it. The outcome of the gift is the beautiful High School building as seen in the illustra-

tion. The west wing was erected and occupied at once, the accommodations, for the time, being ample. The fine edifice has been completed, and is occupied. The west wing accommodates the pupils; the east wing contains the museum and library on the first floor, and assembly hall on the second floor. The central portion contains offices, recitation-rooms, music and drawing rooms, and is so constructed as to preserve a remarkable symmetry and beauty of the whole. The grounds are so graded as to leave the building on a terrace, a lovely lawn filling the space between the fence and house. The block is surrounded with a neat stone coping and iron fence, and broad stone walks lead up to the entrance. Trees, fountains, electric lights, and other attractions add wondrous beauty to the structure, which reflect the noble generosity of the city. The whole cost is somewhere from three to four hundred thousand dollars, — a school edifice that challenges comparison with any High School building in the United States.

Denver and its schools are well supplied with libraries. The report of the Chamber of Commerce furnishes some interesting facts. The Public Library of the Denver Chamber of Commerce and Board of Trade has twenty thousand volumes. Its large reading-room has on file twenty of the principal American and English magazines, fifteen daily and forty weekly papers. The report says of its museum: —

"In connection with the reading-room is the nucleus of a fine museum, embracing the collection of animals, birds, fossil remains, relics from the ancient Aztec ruins, etc., of the State Historical Society; a large and very interesting collection of relics from nearly all the great battle-fields of the late war; a cabinet containing specimens of all the native woods of Colorado; a carefully selected and very valuable cabinet of Colorado minerals, with the basis of a fine horticultural and agricultural exhibit in the form of preserved small fruits, with grains, grasses, etc. But perhaps the most valuable, certainly one of the more interesting, is a cabinet of rare old books of the fifteenth and sixteenth centuries (originals), some of them beautifully illustrated, which was presented by Mr. L. A. Watkins, of this city, a connoisseur on works of this class and an enthusiastic supporter of the library. Many other contributions of rare specimens are promised by this patriotic member, and undoubtedly like favors will be received from others, so that in a few years the Chamber of Commerce library and museum will be one of the most attractive resorts in the West."

Other libraries contain volumes as given below: —

	Vols.
State Library	10,000
State Supreme Court Law Library	6,000
Symes' Law Library	6,000
High School Library	4,000
Gilpin School Library	1,000
Whittier School Library	1,000
Longfellow School Library	500
Franklin School Library	1,000
Catholic Library Association	2,000
Denver University	——
Wolfe, Matthews, and Jarvis Halls	——

Denver has a large supply of private schools. The "University of Denver" is under the auspices of the Methodist denomination, designed to do for the New West what the Boston University is doing for New England. It is rapidly increasing its literary advantages for young ladies and gentlemen.

"Wolfe Hall" was established by the Episcopal denomination in 1868, — a home school of the first class, exclusively for girls, capable of accommodating from two hundred to three hundred pupils.

"Jarvis Hall" was established in 1869 by the Episcopal denomination, exclusively for boys. It is a thorough school, and very popular.

"Brinker's Collegiate Institute" was established in 1877 by Prof. Joseph Brinker, of Kentucky. The school has primary, commercial, musical, military, and collegiate departments, together with a "School of the Arts" and a kindergarten. A corps of accomplished teachers, thoroughly trained for their work, assures the best of discipline and culture. The capacity of the school for the accommodation of scholars has been tested from the beginning.

All of these private institutions occupy large, substantial, and handsome buildings.

There are other prosperous private schools in the city which challenge public confidence by their broad plans and thorough work; and we mean no invidious comparison by calling attention to the foregoing. Our only purpose is to furnish the reader with a sample of the schools and school-buildings to be found upon what was so recently the Sahara of the West.

Churches are numerous, all denominations being represented in the list. Several houses of worship in the city are elegant and costly structures.

GROWTH OF COLONIES.

The remarkable success of certain colonies in the New West deserves special notice. Their growth and prosperity are among the marvels of that wonderful country. Our space, however, will admit

the history of only two. The first is that of Greeley, Colorado, founded in 1870. The originator of it was the late Horace Greeley, of New York, whose name the beautiful town bears.

The citizens celebrated the fifteenth anniversary of the colony in 1885, and Gen. R. A. Cameron told the story of its life as follows: —

"It was in December, 1869, that the first call was issued for a meeting for the formation of this colony. It was agreed that Mr. Meeker should write a letter for publication in the New York *Tribune*, asking those who thought of moving West to establish a colony with high moral purposes and temperance platform, to get together in Cooper Institute on the day before Christmas. He did so; and on that day, the 24th of December, 1869, the first meeting was held. At that meeting there were about one hundred and fifty people present — there might have been two hundred. Mrs. Cameron was the only lady present; and after two hours' discussion it was determined that we should form a colony, and the name adopted was 'Union Colony, No. 1.' An executive committee was appointed, and Mr. Meeker made president. I was made vice-president, and afterwards superintendent. The colony, at their second meeting, appointed a locating or visiting committee; it consisted of Mr. Meeker, a man by the name of Fiske, of Toledo, and myself. After we got on the road, it was seen that Mr. Fiske took but little interest in the colony, and consequently, by mutual consent, we put Mr. West in his place.

"Well, we rambled over Colorado and Utah, and looked at locations hither and thither, and finally concluded that the Cache la Poudre Valley was the best place to locate in, and returned to New York and reported. It seemed desirable that we should keep it a secret, and we did so until the land had been secured. The locations suggested were very numerous. The Bear River Valley near Salt Lake; the Great Bend region on the Platte, — a location near Fort Collins; but we thought after close scrutiny that this was the better soil for wheat and potatoes. At one time I believed we would locate in the Big Bend region, near Platteville. Mr. Meeker was earnest in his desire to locate there, and I liked that location myself. But we met a friend and adviser in the person of our now honored governor, Benjamin H. Eaton, who had a good deal to say about the soil and his experience in this country and New Mexico; and his persuasion brought us here to the Poudre Valley.

"At first it was not settled that this should be so exclusively a temperance colony. The question was not discussed as to how far we should go in this regard, until one night Mr. Greeley sent for me,

and asked me to meet him and Mr. Meeker in his office up stairs in the *Tribune* building, when Mr. Greeley said to us something like this: —

"'There are very many places in the world you can go to and get drunk, but there are very few places that you can go to where you are obliged to keep sober. It is very easy to get drunk, but it is very hard to stay sober. Now, there are men, the husbands of good women, who drink, and their wives want to save them; there are intelligent young men of great promise, whose fathers and mothers want to save them from the evil influences of drink; there are sisters who have brothers they want to save. Now, I desire and am earnest for humanity's sake, that you people build up an asylum under the shadow of the Rocky Mountains, under new circumstances, where you shall live by irrigation and flourish in a new clime, where a man can go and cannot get drunk. There are many men who desire such a place. As there are thousands of places where men can get drunk, let us have one place where they cannot get drunk. What I desire in this matter is not for myself, but for humanity.'

"And as he spoke, the tears came into the eyes of that great head, and the deepest emotion swelled that great heart. All commercial reasons, all other objections, all other objects floated from my vision, and Mr. Meeker, rising from the table at which we were sitting, said, 'That is the platform.' Mr. Greeley looked over to me and said: 'Mr. Cameron, what do you say? We desire you to go with us, and we want you to become imbued with this spirit of humanity.' I arose, reached my hand across the table, and took his extended hand in mine, and with weeping eyes we swore together that we would devote our lives to this purpose, to this ideal, to this inspiration, until, with the aid of God Almighty, it should prove a success.

"Of the struggle, the hardships, the grievances, personal disasters, etc., of the early colonists, I have nothing to say to-day. It is sufficient for us to know that the ideal, the vision, has become a realization. It is sufficient to know that all the bloom has ripened into golden fruit. To-day we have here the most peaceable, the most prosperous, the most law-abiding, the most conscientious, the most intelligent, the most earnest, the largest-hearted people which God ever brought together. And the people all over the State have drawn inspiration from it.

"Longmont Colony followed it; Fort Collins followed it; Colorado Springs followed it; Manitou followed it; the development of the railway system followed it; the development of the natural resources

of Colorado followed it. The inspiration which has made Colorado what she is, is in a great measure attributed to the influences of Union Colony. Such men as Shattuck, Nettleton, Eaton, and Pabor, who have done so much for our State, are the outgrowth of this colony. The inspiration which this colony has given, and which extends like a halo over the tops of the Rocky Mountains, and is seen even to the sea and all over the continent to-day, is immeasurable. To Mr. Greeley, Mr. Meeker, and all those devoted spirits who started this conception and stayed with it all through its trials, troubles, and tribulations, there is nothing but glory, honor, and success, and to them be praise for evermore for the great work they have accomplished."

The call for the first meeting in New York, written by Mr. Meeker, contained the following paragraphs : —

"I propose to unite with proper persons for the establishment of a colony in Colorado Territory, and the persons with whom I would be willing to associate must be temperance men, and men ambitious to establish good society.

"My plan would be to make the settlement almost wholly in a village ; all the lots of the village should be sold, that funds may be obtained for making improvements for the common good, such as the building of a church, a town hall, a schoolhouse, and for the establishment of a library. Adjoining the village, the outlying tracts could be apportioned, by lot or otherwise, in size according to distance from the village centre. Some of the advantages of settling in a village will be easy access to schools and public places, meetings, lectures, and the like, and society can be had at once.

"I make the point that two important objects are to be gained by such a colony. First, schools, refined society, and all the advantages of an old country will be secured in a few years, while on the contrary, where settlements are made by the old methods, people are obliged to wait twenty, forty, or more years. Second, with free homesteads as a basis, with the sale of lots for the general good, the greatly increased values of real estate will be for the benefit of all the people, not for schemers and speculators. In the success of this colony, a model will be presented for settling the remainder of the vast territory of our country.

"Third, whatever professions and occupations enter into the formation of an intelligent, educated, and thrifty community, should be embraced by this colony, and it should be the object to exhibit all that is best in modern civilization. In particular should moral and

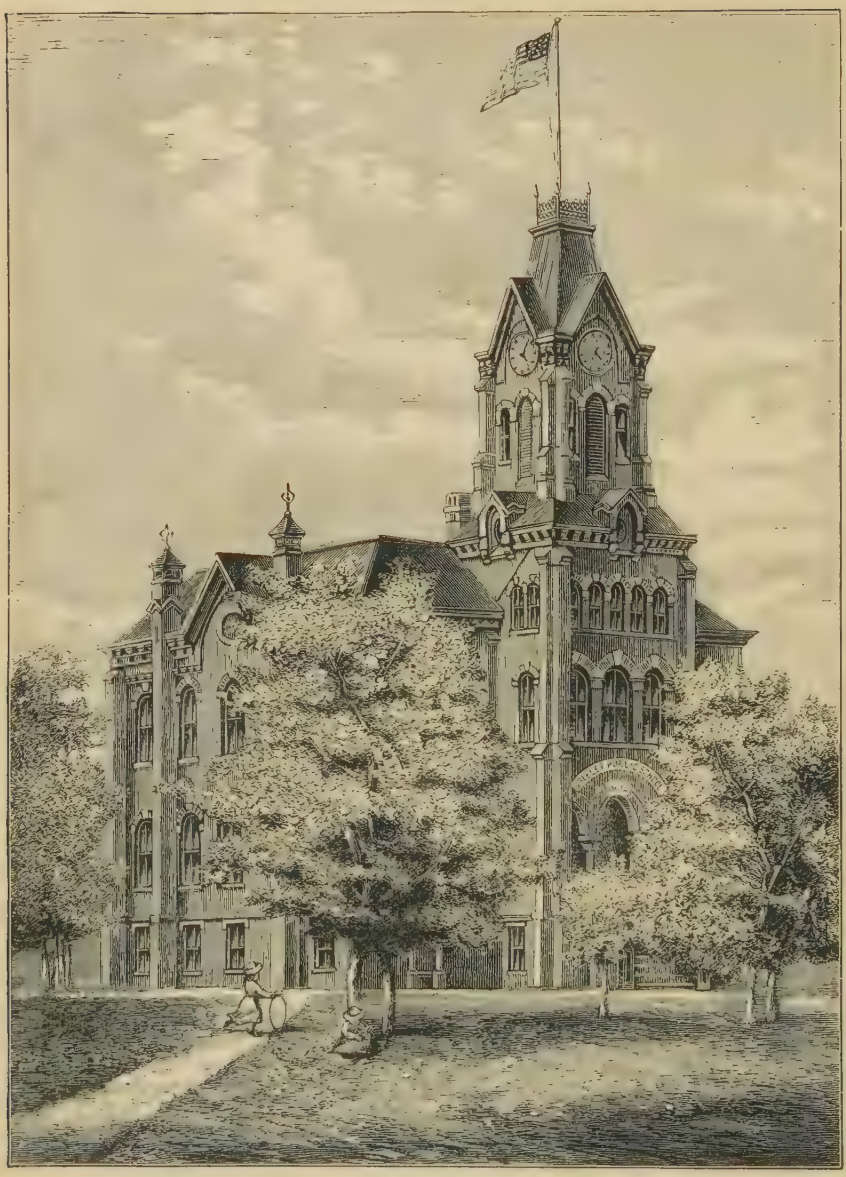
religious sentiments prevail, for without these qualities man is nothing. At the same time, tolerance and liberty should also prevail.

"One thing more is equally important. Happiness and wealth and the glory of a state spring from the family, and it should be an aim and ambition to preserve the family pure in all its relations, and to labor with the best efforts life and strength can give to make the home comfortable, to beautify and adorn it, and to supply it with whatever will make it attractive and loved."

"Temperance, Education and Religion" were the three pillars of the colony from the start. How nobly the colonists adhered to their purpose to provide the best schools for their children, appears from the following illustration of their first school-building, erected when the colony was but three years old, at an expense of *thirty-five thousand dollars.* Two ward schoolhouses, in addition, cost ten thousand dollars each.

Few towns or cities in the East can boast a more elegant school-building than this. It is built of brick, and is provided with all the modern improvements of a first-class schoolhouse, including chemical and philosophical apparatus, laboratory, library, etc., etc. From personal observation we do not hesitate to say, that, within it are schools, including High School, that are equal in thoroughness and discipline to the best schools of New England. Teachers are paid nearly twice the salary paid in Massachusetts towns of like population and wealth, thereby securing the best teachers to be found east or west.

The grounds are ample and beautiful, occupying a whole block, with Lincoln Park in front. Part of the grounds are laid out in delightful lawns, which irrigation keeps green and velvety. The remaining portion furnishes a convenient play-ground for both sexes; and the whole is beautified with thrifty shade trees. A janitor is employed, on a salary of five hundred dollars annually, to take care of the building and grounds. He must be present when the school is in session, to respond promptly to the calls of teachers and pupils for his services. He sweeps the whole building daily, washes the stairways and halls weekly, and keeps the interior as neat and clean as a good housekeeper does her home. With a population of two thousand five hundred, Greeley has been appropriating an average of ten thousand five hundred dollars for its schools for several years, — nearly twice as much as the towns of Massachusetts of the same size expend upon their schools. At the fifteenth anniversary of the colony, Hon. J. C. Shattuck, then a resident of Greeley, and super-



HIGH SCHOOL BUILDING.

intendent of the schools of Colorado, called attention to the following significant fact: —

"When, in the unfinished room of that schoolhouse on the 13th of October, 1873, the citizens voted to instruct the district board to

raise as a *special* tax for that year, in the midst of their poverty, with scarce a thousand men here who were not living on the means they brought with them; under such circumstances, they instructed their district board to raise by special tax for the purpose of building and carrying on of schools through the year, the sum of eight thousand dollars. That, put on to the regular school tax for that year, ladies and gentlemen, meant a total school tax that year of five per cent. If that is not a record of which any people might be proud, then show me another. They voted it themselves, paid it themselves, and without a murmur; and as I think of it, and think of who these people were, of their indomitable spirit, their proud independence, I can imagine very easily what a rebellion had been here, if any power above us had ordered a tax of five per cent that year; but we did it ourselves and paid it, and finished our school-building, now the pride of the city, and kept our school going. That spirit, ladies and gentlemen, is a prouder legacy and richer endowment than any people ever had in dollars and cents."

FIRST PLACE OF WORSHIP.

It is the policy in the New West to erect commodious, substantial, and handsome school-buildings in the outset. It is deemed both economical and wise to build them for a generation, or longer. Hence, on approaching many Western towns, the traveller beholds a large, elegant, brick edifice, attractive beyond all other structures in the place; and he soon learns to say: "That is the schoolhouse." But the policy is otherwise in erecting houses of worship. With their limited means, it is economic to provide temporary places of worship at first. Hence, for ten years, the Congregational Church of Greeley worshipped "on the spot where the first public religious service in the colony was held in an adobe building occupied at first as a hotel, and called the 'Park House.'" Now the society occupies an attractive house of worship, erected at an expense of seven or eight thousand dollars. The city contains eight houses of worship, — Congregational, Presbyterian, United Presbyterian, Baptist, Methodist, Episcopal, Unitarian, and Catholic, — all of them an ornament to the town.

The above cut represents the first building in which religious wor-

FIRST HOTEL.

ship was maintained. It was an old building removed from Cheyenne. Lumber had to be hauled thirty or forty miles, so that the purchase and removal of this building proved a godsend to the pioneers. It was used for a boarding-house, freight-house, and public hall. Here all secular and religious meetings were held. Bustle and confusion reigned within it through the week; but on Sunday morning, trunks, bales, and packages were arranged for seats, and the people gathered for worship. Subsequently it was converted into a schoolhouse, and was so used until the elegant new schoolhouse was completed, when it was converted into a livery stable, to which purpose it has been devoted ever since. In those early days,

LAST HOTEL—THE "OASIS."

when it was used for a variety of purposes, it was called "Hotel de Comfort." Without it the hardships of the pioneers would have been largely multiplied.

The two cuts on page 374, by contrast, show the difference between *then* and *now*. A shelter only was demanded in 1870; *now*, convenience, elegance, luxury. The new public house is called "The Oasis," and was erected at an expense of *eighty thousand dollars*, thirteen years after the "Greeley House" offered only poor shelter to wayfarers. Several other hotels, less pretentious than "The Oasis," though far, far in advance of the "Greeley House," are found in the city. The colony purchased more than seventy thousand acres of land; nine thousand acres of the Denver Pacific Railway Company, for thirty-one thousand dollars; two thousand five hundred acres of individuals, for twenty-eight thousand dollars; and sixty thousand acres of the United States Government. For irrigation, a ditch was dug around the whole tract, taking water from the Cache de Poudre River. Herds of cattle grazed upon these plains, so that the farms of the colonists must be protected by fences. But many of them had spent their last dollar when this stubborn fact confronted them. For this reason, the colony decided to put a wire fence around the whole tract (more than fifty miles of fence), thus protecting all, at the public expense. Each man paid *five* dollars for current expenses when he joined the colony, and, held subject to the call of the Treasurer, one hundred and fifty dollars for the purchase of land.

The town is laid out in squares, the streets being one hundred feet wide, including sidewalks twelve feet wide on each side. Both sides of each street are lined with shade trees; and on one side of each street, also, is an irrigating ditch, dispensing its fresh, pure water, to make the vegetation green and cheerful. The town has a hundred miles of irrigating canals. It is appropriately called the "Garden City."

The following illustration represents one of the several fine business blocks which are an ornament to the town. It was erected at an expense of nearly eighty thousand dollars. The demand for such structures may be learned from the following statement of a *Tribune* (Denver) correspondent, who collected the facts and statistics with great care for publication: —

"Few cities of its age and size have attained the world-wide reputation of Greeley. During the last year two very fine brick blocks have been erected on Main Street: one by the First National Bank, costing $40,000; the other, by Hunter & West, bankers, costing

$60,000. Last year Mr. Hunter also built a magnificent three-story brick block opposite the First National Bank, in which are located the Post Office and the Masonic Hall.

"Greeley also boasts of a well-organized fire department, with a steam fire-engine, and a military company numbering sixty-two. The latter has the finest armory in the State, and a drill-room 47 × 112 in the new Hunter block.

BUSINESS BLOCK.

"The Electric Light Company have their plant, costing $15,000, in complete order, and the whole city is now lighted with electricity. Eight artesian wells, depth 1,200 feet, supply the town with fine drinking-water. A large library, containing 3,000 volumes, has been supported for several years past. A system of drainage and sewerage has been adopted by the Town Board, looking to improved sanitary conditions of the town. There are eight physicians and ten lawyers in Greeley, who have a healthy community and an empty jail for their encouragement.

"The following is a list of Greeley's business houses, with the amount of business done during the year: —

"Five agricultural implement dealers, $150,000; 3 bookstores and music dealers, $50,000; 1 bakery, $8,000; 5 blacksmiths, $20,000; 10 building contractors, $200,000; 3 barbers, $7,000; 1 business college, 50 pupils; 3 clothing dealers, $100,000; 5 confectioners, $15,000; 3 coal dealers, $50,000; 3 carriage and wagon dealers, $20,000; 1 candy manufacturer, $3,500; 2 dentists, $4,000; 3 drug stores, $35,000; 4 dry goods, boots and shoes, $175,000; 6 eating houses, $20,000; 1 elevator, $200,000; 2 flouring mills, $250,000; 2 feed stores, $10,000; 2 furniture dealers, $20,000; 1 gunsmith $1,500; 7 groceries and provisions, $250,000; 3 general merchandise, $100,000; 2 hardware, $70,000; 3 harness makers, $20,000; 4 hotels, $75,000; 3 jewellers, $25,000; 2 lime dealers, $7,000; 2 lumber yards, $70,000; 2 liveries, $5,000; 2 merchant tailors, $10,000; 5 milliners, $20,000; 5 meat markets, $80,000; 2 photographers, $4,000; 2 produce dealers, $200,000; 3 paint shops, $15,000; 1 sash factory, $20,000; 1 sewing-machine office, $5,000; 4 shoe shops, $10,000; 2 tobacco dealers, $7,000; 1 violin maker, $2,000; 1 wagon maker, $5,000. The business amounts to nearly three million.

"In addition to the above, there are three banks, whose aggregated capital is $205,000, with a deposit account of $375,000. The real estate agents made sales amounting to $180,000. The Building and Loan Association, capital stock, $200,000, organized in 1883, has cleared up to the present time, three years, forty per cent upon its investments. The three brickyards made about 1,000,000 bricks each, during the year, all of which were used in Greeley. Hawks & Tuckermon's Creamery, about three miles from Greeley, has a capacity of 300,000 pounds of butter a year. The life and fire insurance companies have written policies amounting to nearly $2,000,000 during the year.

"The Pickling Works paid to the market gardeners of the town, last year, $10,000 for more than a million pounds of cucumbers and tomatoes. The Irrigation Pump Works, with a capital of $150,000, employ thirty men, and is a fortunate industrial accession to the place; proving that the citizens were wise in starting the enterprise.

"The financial condition of the town is good, it being out of debt, and its warrants at par."

From the report of the secretary of Greeley's Board of Trade last year we extract the following: —

"There are no saloons, and consequently we have no need of a police force. One marshal is appointed by the board, and he seldom has to make an arrest. This, in a city of two thousand five hundred population, is remarkable. His services last year cost eighty-three dollars.

"The business houses would be an honor to a city much larger, few cities having finer stores or more complete stocks of goods. All these, coupled with a community of intelligent, progressive citizens, make a city that we are proud of, and to which we invite those who desire to settle in a home where the temptations of liquor and gambling are not thrown around the young; where the sun shines three hundred and fifty days in the year; where we never have a cyclone; where the air is dry and pure; and, best of all, where the beautiful Rockies, with their snow-clad summits, are always in full view for over one hundred miles.

"Over two hundred and fifty thousand dollars, on the average, have been spent annually in valuable improvements, for several years past by the city. The schools are not surpassed by any, east or west.

"The total number of pounds of produce, potatoes, flour, and grain, shipped from the Greeley station in 1884, was 26,375,580. In the absence of the figures for 1890, we will only add that the business has largely increased."

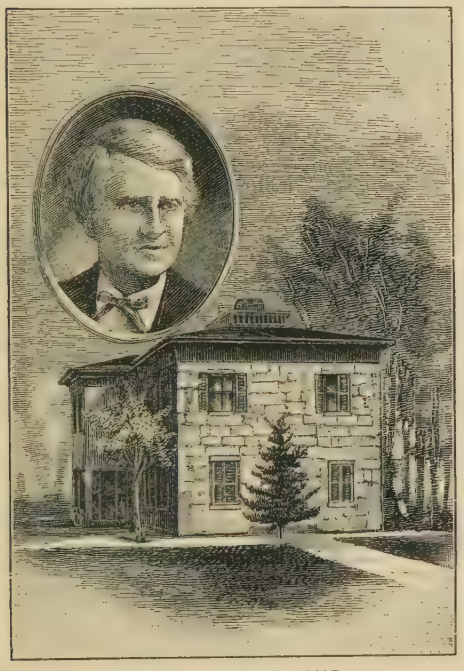
The reader may be curious to know how the Colony succeeded with its temperance platform. In the East, many of the leaders of thought and enterprise believe that a liquor-shop is indispensable to civilization; but here is a town, at the base of the Rocky Mountains, proposing to get on without even one. How could this be done? From a paper read before the "Colorado Historical Society," by Hon. W. E. Pabor, we extract the following: —

"May 12, 1870, in executive committee, a resolution was adopted requiring the insertion, in all deeds to be given, of the following clause: 'That it is a part of the consideration in this deed, that intoxicating liquors shall not be manufactured or sold as a beverage, nor shall gambling of any kind be permitted on the premises conveyed.'"

Five months thereafter the first test occurred, of which Mr. Pabor speaks thus: —

"October 23 was the Sabbath day, and therefore a day for good deeds. It had been rumored during the preceding week that a saloon had been opened on a ranch adjoining the town in which the Colony owned a half-interest. At the close of the morning service in Colony

hall, we were requested to remain, and a brief statement of the case was made. A committee was appointed to visit the saloon-keeper and report. About two hundred persons accompanied the committee. The keeper, of course, asserted the rights he had obtained from the parties owning the other half-interest in the land and building, but at last a compromise was effected by which the liquor was to be removed to a place of safety, while the matter was investigated. But parties present who did not endorse such action soon fomented a disturbance, and shortly the building was found to be on fire in two or three places. The rum, the card-tables, the decanters, the dice-boxes, etc., were speedily hustled out, and a line of men with water buckets formed to the river just below; but the pails were leaky and the men unskilful, and so the building burned down. The affair culminated in the justice's court, but no one knoweth, even unto this day, if the shanty was set on fire or it was a case of spontaneous combustion."



MEEKER AND HIS HOME.

At this time the colony numbered one thousand, and three hundred and fifty-two houses had been built, or were in process of building.

The name of Nathan C. Meeker, first president of the Greeley Colony, has appeared in the foregoing pages. He was a philanthropist and noble man, and his tragic end deserves mention here. He was appointed Indian agent to the White River Agency, and accepted the trust solely on account of his desire to benefit the Indians. He thought that he could readily teach them how to till the soil, whereby to support themselves, and, at the same time, establish schools among them that would insure their intellectual growth. He thought they might be made industrious, intelligent, and virtuous. But, alas! Mr. Meeker was massacred by the treacherous men whom he sought to benefit, on the twenty-third day of September, 1879. The Indians

were unwilling to work, and grew restive under the white man's rule. Naturally lazy and indolent, they became dissatisfied with their benefactor and his plans. After an interview with Mrs. Meeker, and carefully studying the history of the barbarous affair, we believe that these lazy, thievish, treacherous Utes, properly called savages, murdered Mr. Meeker, because he persisted in teaching them industry and virtue.

Colonel Steele was at the agency on the 10th of September, and witnessed so much excitement among the Indians, that he suggested to Mr. Meeker's secretary that the redskins were bent on mischief. After this conversation with the secretary, "Ute Jack" approached the Colonel, and said: —

"What white man want? White man go. Indian want white man go. Indian no like plough and go school. Meeker all time say 'work and go school.'

"Presently another Indian approached him, and fired off his 'white man go.'"

Colonel Steele had abundant reason to believe that the massacre was deliberately planned some time before it occurred — one of the most heartless and hellish butcheries to be found in the annals of time. The following account of it by Mrs. Meeker was published in the New York *Herald*, soon after her release from captivity: —

"I went with my daughter Josephine to the White River agency, where we joined my late husband (the agent) July 17, 1878. We did not like the site of the old agency, as it was in a cañon. The altitude was too great for the practice of agriculture, and the winds blew fiercely and constantly. The government, therefore, gave permission to Mr. Meeker to move the agency twenty miles further down the White River to a beautiful valley, where the grass is always green, where there is no snow, and where there is plenty of land to cultivate, and timber in abundance.

"Trouble began when the agent indicated an intention of ploughing eighty acres of land lying between Douglass Avenue and the river. The Indians had not used the land except for their ponies to run on. It was open and unoccupied. As soon as he heard of any dissatisfaction about the matter, the agent called the Indians together and settled it by obtaining the consent of the majority of the Indians to plough. Chief Johnson failed to attend the council, and when the Utes gave their permission he grew angry, and it was his son who shot at the ploughman. Afterward Johnson said he was 'no angry'; but back of all this there were signs of wickedness and secret plot-

ting, suspicious movements, increasing rumors, large sales of ammunition, and false charges that the agent had cut down the rations. This last was false. The government had reduced or changed the issue of rations for all the Indians. My husband gave the White River Indians regular and full government rations, but he had orders from Washington not to issue rations to the Uncompahgre, Uintah, Arapahoe, or other outside visiting Indians. This was according to his official instructions. The object was to keep the Indians from straying from the reservation and wandering around the country. The Uncompahgre Utes complained to Ouray, and this is the foundation for the statements published that the agent withheld their supplies. All the White River Utes proper were fed according to law, and those who worked on the canal received double rations, extra blankets and shoes, and all kinds of agency goods which they needed. An Indian woman was hired to cook for the Indian workmen, and they were paid fifteen dollars a month, cash, for working on their land.

"The Indians were well treated, but the agent did not propose to have them take charge of his household and office, and dictate to him how he should conduct his affairs. He would not tolerate their idleness and insolence, so they conspired to get him out of the way. They clamored for a new agent, and it was only when they heard of the troops coming that they became frightened at the results of their work. Jane, the woman who first growled about the ploughing, spoke good English. After we were captured, she said: —

"'What could you expect? The Indians had to kill the whites, because neither they nor the agent would do as the Utes told them to do.'

"On the morning of the massacre Douglass came to the agency and spoke of the soldiers coming. My husband said: —

"'Let them come. They will not hurt any one. But we will send for all the chiefs and head captains, and hear their complaints, and talk the matter over.'

"Douglass did not say much, and went away. We did not fear any particular danger, though on Saturday, three days before the massacre, they had moved their tents and women and children to the wilderness. The Indian Pauvitz asked me on Saturday, Sunday, and Monday, if I was afraid. I said, 'No.' Pauvitz was the husband of Jane.

"I was in the kitchen with my daughter, washing dishes, about half-past one o'clock. We had just finished dinner. Some of the In-

dians had eaten with us, and Chief Douglass had been picking around the table and joking with my daughter Josephine while we were washing the dishes. There came a volley of firearms — a succession of sharp explosions. It was startling, and I knew what was coming. My daughter and I looked into each other's faces. Mrs. Price, who was washing clothes at the door, rushed in, exclaiming: —

"'What shall we do?'

"Josephine said, 'Keep all together,' and the girl was as cool as if she were receiving callers in a parlor.

"The windows were shot in. Our first move was to get under the bed in Josephine's room to avoid the bullets, which were whizzing over our heads. Josephine had the key of the milk house, and proposed to go there. The bullets were flying like hailstones, and we locked ourselves into the milk house, which had double walls filled in with adobe clay, and there was only one little window. We stayed there all the afternoon, and heard no sounds but the crash of guns. We knew all the men were being killed, and expected that the Indians would finish the day with the butchery of the women. Frank Dresser came in shot through the leg. He killed an Indian just as we let him into the milk house.

"About five o'clock in the afternoon the firing ceased and all was still. Suddenly we heard the low crackling of flames, and smelt smoke. Then we saw it coming through the cracks in the ceiling, and knew that the destruction of the agency buildings had begun.

"While in the building we barely whispered, and tried to keep Mrs. Price's babies still. As the fire was increasing we left the milk house cautiously, and Josephine reconnoitered the enemy.

"'It is a good time to escape,' she said. 'The Indians are busy stealing agency goods.'

"We went around in front of the agent's office, and found the doors open and things undisturbed, except that some of my husband's clothing lay on the front stoop. We saw no one, living or dead, and no sign of any one having been killed. We ran, in a line with the buildings, toward the sage brush, so as to keep the buildings between us and the Indians, who were at the warehouse pulling out the goods; but we had not gone far before we were discovered, and the Indians made for us, firing as they ran. The bullets fell all around us, and one struck me on the thigh, ploughing through the flesh, just under the skin. It stung me like a wasp, and I thought it time to drop. I fell to the ground. The Indians captured Josephine and Mrs. Price first, as they were behind me, with Mrs. Price's babies.

"You have my daughter's account of her experience. A chief, whose name I could never learn, came to me and said he was 'heap sorry.' He asked me if I could get up. I said 'Yes.' He then asked me if I would go with him. I said 'Yes.' He said he was 'heap mad; soldier killed Indian;' he saw them shoot, and he was 'heap mad.' They would 'no kill women and children.' The Indians had so ordered it. He said he would take me to Chief Douglass' house, and asked if I had any whiskey. I said, 'No'; and he asked if I had any money. I answered that there was some in my room in the building then on fire. The Indian told me to get it and he would wait for me. He was afraid to go into the burning building. I got the money, the Indian urging me to hurry up, as he had a great way to go that night. We went to Douglass' camp, and the Indian made me count the money. There were thirty dollars. The Indian took it and gave it to Chief Douglass. I had two silver dollars, and Douglass gave them to the Indian who captured me. The Indian then went away. I told Douglass that I must have some blankets. He sent an Indian named Thompson to the burning building with me, and I got a hood, a shawl, and one blanket. I handed around bedding, etc., among the Indians, rather than have them destroyed. The Indians took them, and I afterward saw them in camp, when I was suffering for the want of blankets to keep me warm. I told Douglass that I wanted my medicine and my 'spirit book.' I had doctored Douglass and his family. He said 'Go'; so I went back a second time, and got a large copy of 'Pilgrim's Progress' and a box of medicines. The box was so heavy that an Indian refused to carry it. It was lost, but he took the book. When I got back to Douglass, and told that chief the Indian had said that the medicine chest was too heavy to carry, Douglass looked disappointed and sorrowful, and asked:—

"'Couldn't you have split the box a little, so you could have brought part of it?'

"In going back this last time I saw the body of my husband stretched on the ground in front of the warehouse; all the clothing was gone but the shirt. The body was not mutilated. The arms were extended at the side of the head. The face looked as peaceful and natural as in life, but blood was running from the mouth. I stooped to kiss him; but just as my lips were near his, I saw an Indian standing stone still, looking at me, so I turned and walked away. Douglass afterward said that my husband was shot through the side of the head.

"Preparations to leave immediately were made. It was now dark,

and Douglass lost no time in getting started. Being lame from having had a thigh dislocated three years ago, and not being used to riding, I asked to ride behind Douglass. The moon came out so clearly that the night seemed like day. We forded the river and trotted off towards the mountains on the south.

"Douglass' breath smelled strongly of whiskey. He said: 'Your father dead; I had a father once; he too is dead. Agent no understand about the fight Indians make.'

"The other Indians all took out bottles of whiskey, which they held up between their eyes and the moon as they drank, so as to see how much was left. Douglass, as he rode along, sang what seemed to be an obscene song to a pretty melody in slow measure. When he had finished, he asked how I liked it. My limb ached so terribly that I could scarcely sit on the horse. Douglass held it a while; then he strapped it in a kind of a sling to his saddle. I asked if I could see my daughter, Josephine. Douglass replied, 'Yes.' As we rode, a

CAPTIVITY OF MRS. MEEKER AND DAUGHTER.

villanous-looking Indian trotted alongside, and slapped me on the shoulder, and asked me how I would like to be his squaw, and made indecent proposals. Chief Douglass listened and laughed. He said the Indian was an Arapahoe, and I would kill Utes if I married an Arapahoe.

"We left the trail, and came to a little cañon in the mountains, with high rocks on all sides. All dismounted, and the prisoners were searched by the Indians, even to our shoes and stockings. They stole my pocket-book, which was full of needles, and a handkerchief; but they gave the handerchief back. They talked indecently to us, and made shameful proposals. They were drunk, and their conversation was loud with ribaldry. They even threatened me with death if I did not submit to their bestiality. Fortunately I escaped outrage, but had to submit to terrifying threats of violence and death. Douglass went through the burlesque of imitating the employees in keeping guard at the agency. He mocked the soldiers, walking up and down with a gun on his shoulder, and sang.

"As I lay on the ground, not knowing when I should be butchered, I thought of my young daughter Josephine, who was not far away, and wondered if she had already been slaughtered. My face was partly covered, but suddenly I heard Douglass' voice. I turned and saw Chief Douglass standing close by me, with the muzzle of his gun pointed directly at my face. I involuntarily cried out. Josephine heard me, and her voice came out of the night, saying: —

"'I am all right, mamma; don't be afraid!'

"Douglass lowered his gun, raised it again, and took aim. I said nothing and he walked away. An Indian standing near said: —

"'Douglass no hurt you; he only playing soldier.'

"After resting for half an hour we remounted and rode until midnight, when we reached the Ute women's camp. Douglass ordered me roughly to get off the horse. I was so lame and in such pain that I told him I could not move. He took my hand and pulled me off, and I fell on the ground because I could not stand. An Indian and a squaw soon came and helped me up, and led me to a tent. When I went to bed Douglass and his wife covered me with blankets, and I was more comfortable that night than at any other time during my captivity. Early next morning Douglass awoke me, saying: —

"'Runner just come; Indians killed heap soldiers; Douglass go to front; gone five days.' He said I must stay in his tent and wait until he returned.

"Douglass' squaw treated me very well for one or two days; then

she began to ill-use me, and gave me nothing to eat for one day. While Douglass was gone, his son-in-law told me frightful stories. He said the Indians 'no shoot' me, but would stab me to death with knives. One squaw went through the pantomime of roasting me alive; at least, I so understood it. Josephine told me that it was only done to torment me. If Douglass had got killed, I would probably have been punished. A row of knives was prepared with scabbards and placed in the tent for use. Then Douglass' son-in-law, Johnson, came to me and asked if I had seen the knives being fixed all day. I said 'Yes.' He replied that 'Indians perhaps stab' me, and 'no shoot' me. 'You say Douglass your friend; we see Douglass when come back from the soldiers.'

"Many of the squaws looked very sorrowful, as if some great calamity were about to happen; others were not kind to me; and Freddie Douglass, the chief's son, whom I had taken into my house at the agency and washed, and taught, and doctored, and nursed, and made healthy, came to me in my captivity and mocked me worse than all the rest. The Douglass blood was in him, and he was bad. He said I was a bad squaw and an old white squaw. He tried to steal the old wildcat skin that I slept on, and stole my handkerchief while I was asleep, and jeered at me during my imprisonment.

"Douglass returned from fighting the soldiers on Saturday night. On the next day his wife went back to the agency for the cabbages raised by the cultivation the Indians professed so much to despise. Douglass was morose and sullen, and had little to say. He did not seem to be satisfied with the military situation, but thought the Indians would annihilate the soldiers. Large numbers of head men and captains came to consult Douglass. They were in and out most of the night, making speeches and discussing things in general, as though the fate of the universe depended on their decision. Douglass often asked us where the agent was. I said that I did not know. Douglass rejoined that neither did he know. Mrs. Douglass treated me spitefully, and her chief was not much better, though he gave me enough to eat. When he was gone very little was cooked.

"In a day or two Johnson became very cross, and early one morning we began to move again. It was a very long and terrible journey that I made that day. I rode a pony with neither saddle nor bridle nor stirrups. There was only a tent-cloth strapped on the horse's back, and an old halter to guide him with. It was the most distressing experience of my life. Not a single halt was made, and my pain was so great that the cold drops stood on my forehead. I

could only cling to the pony by riding astride. We travelled rapidly over mountains so steep that one would find difficulty in walking over them on foot. The dust was suffocating, and I had neither water nor dinner. Josephine and Mrs. Price rode ahead. One of the mountains was so steep that after making part of the ascent, Douglass' party had to turn back and go around it. This incident shows what hardships delicate women on bareback horses had to endure.

"We reached a camping-ground half an hour after dark and pitched our tents in the valley. The moon was small. I was so faint that I could not get off my horse nor move until a kind woman assisted me to the ground. I was too ill and exhausted to eat, and I went to bed without any supper. We stayed at this place several days. As the soldiers approached, the Indians moved further south, at intervals of two or three days, until they reached the pleasant meadows on Plateau Creek, below Grand River, where General Adams found us. Before we reached this last place Douglass permitted Josephine to come to see me every day, and the long hours were more endurable. The courage of the brave girl and her words of hope cheered me very much. My life would not have been safe had it not been for her influence with the Indians. She could speak some of their language, and she made them cease terrifying me with their horrible threats and indecent stories. She finally forced Douglass to give me a saddle, so that the last days of journeying I had something besides a bareback horse to ride upon. It gave me great joy on one of the evenings of those terrible first days to hear her, as we passed each other in the moonlight, sing out cheerily: 'Keep up good courage, mother; I am all right. We shall not be killed.'

"The last evenings of our stay were devoted to songs and merry-making by those who were not away on the mountains watching the soldiers. Mrs. Price joined in some of the choruses, because it helped us and made the Indians more lenient. They told a great variety of stories, and cracked jokes on each other and on the white men. They had dances and medicine festivals. Notwithstanding these hilarities, however, the Indians were troubled and anxious about the troops. Runners were constantly coming and going. The least rumor or movement of the soldiers threw the Indians into a flutter. Chief Douglass began to realize the peril of the situation. Colorow advised them to go no further south, though the troops were moving down from the north. Better fight and defend their camps, he said, than retreat. Chief Ouray, the friend of the whites, did not want the White River Utes on his domain. Douglass spoke of the

agency as gone forever. He said it would have to be built up again. The Indians had lost all; and with a sigh, he exclaimed, 'Douglass a heap poor man now.'

"When he had time he fell to abusing the agent, and said that if he had kept the troops away there would have been no war. One day I was told that a white man named Washington would come soon. At last an Uncompahgre Ute came from Chief Ouray and spoke very kindly to me, and as he sat by the fire, said, 'To-morrow five white men coming and some Indians.'

"Among them would be 'Chicago man Sherman, a great big peace man.' General Adams said they were going to have a talk, and the captives would go home. The Uncompahgre said that a wagon would be waiting at a certain place below the plateau.

"Next day we were washing at the creek, when Chief Johnson came and said that a big council was to be held, and that we must not come up to the tents until the end of the meeting. Dinner was sent us by the squaws, and we began to have hopes of release, after being deluded with false predictions many times before. Finally, we saw the foremost of the white men on the top of the hill by the tent.

"When I first saw General Adams, I could not say a word, my emotion was so great. We had borne insults and threats of death, mockery and ridicule, and not one of us had shed a tear; but the sight of General Adams, Captain Cline, Mr. Sherman, and their men was too much for me. My gratitude was greater than my speech. We owe much to the wife of Johnson. She is Ouray's sister, and, like him, she has a kind heart. Ouray had ordered us to be well treated, and that we should be allowed to go home.

"The council was a stormy one. Various opinions prevailed. The war-party wanted us held until peace should be made between the Indians and the government. They wanted to set us against the guilty murderers, so as to save them through us. After a few hours of violent speeches, Mrs. Johnson burst into the lodge in a magnificent wrap, and demanded that the captives be set free, war or no war. Her brother Ouray had so ordered; and she took the assembly by storm. She told the pathetic story of the captives, and advised the Indians to do as Ouray requested, and trust to the mercy of the government. General Adams said he must have a decision at once, or he would have to leave. That settled it, and we were set free.

"Next morning, when we were about to start for the wagon, which was a day's journey to the south, Chief Johnson, who was slightly

cool toward us, threw out a poor saddle for me to ride upon. His wife Susan caught sight of it, and was furious. She flung it away, and went to a pile of saddles, and picked out the best one in the lot. She found a good blanket, and gave both to me. Then she turned to her chief, and poured out her contempt with such effect that he was glad to sneak away.

"So long as I remember the tears which this good woman shed over her children, the words of sympathy which she gave, the kindness that she continually showed to us, I shall never cease to respect her, to bless the goodness of her brother Ouray, the Spanish-speaking chief of the South. I trust all the good people will remember them."

COLORADO SPRINGS.

Colorado Springs was settled in 1871 by a colony, after the manner of Greeley, on a temperance and Christian basis. It is seventy-five miles from Denver, by the Denver & Rio Grande, or by the Atchison, Topeka, & Santa Fé Railway. Its population is about twelve thousand.

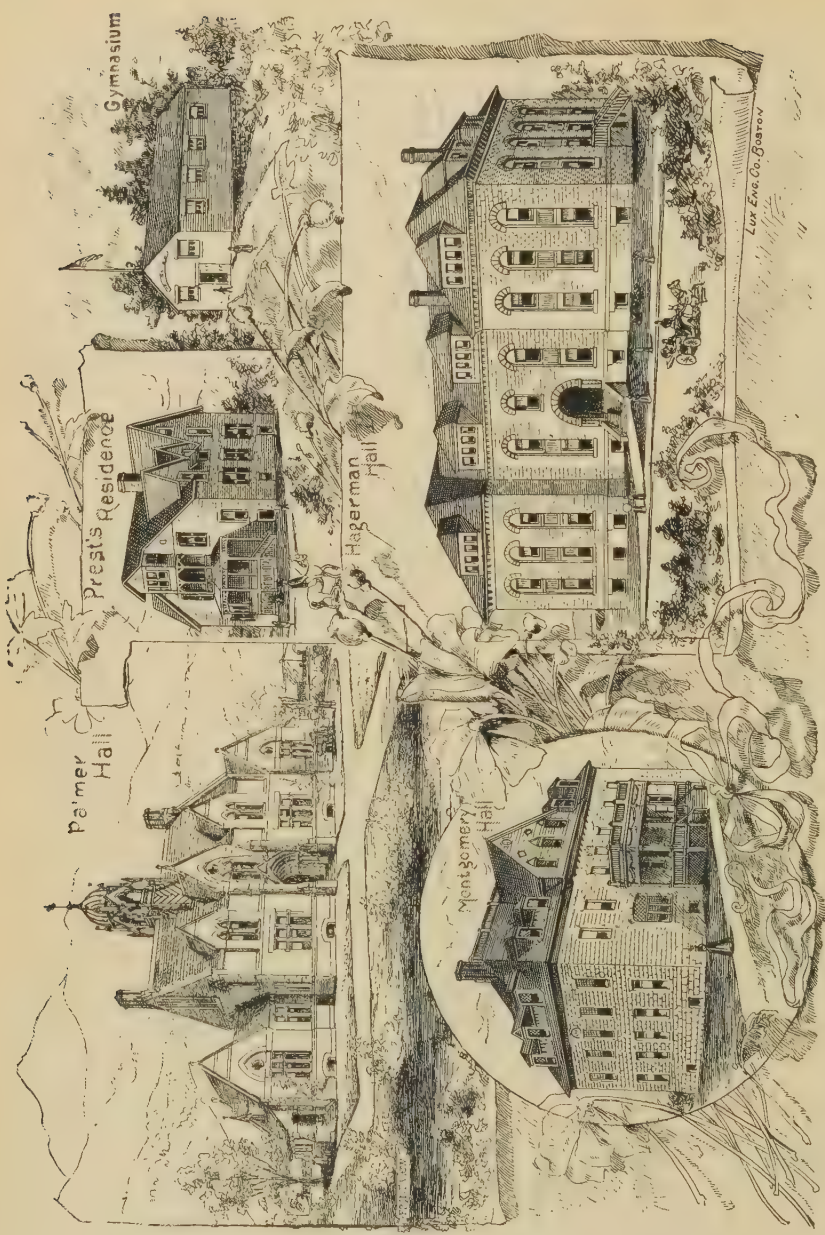
One of the first objects to awaken the admiration of the tourist is the unique and attractive public house ("The Antlers") erected at an expense of nearly two hundred thousand dollars.

"THE ANTLERS."

The artistic design and harmonious appointments of this hotel arrest the attention at once. Inside it is as beautiful as it is outside. No two rooms are furnished alike. Altogether it is a gem of architectural beauty.

The location of the town is delightful, situated as it is at the foot of the Rocky Mountains, on a magnificent mesa, spreading out to the east in a landscape of enchanting loveliness.

Its streets are one hundred feet, its avenues one hundred and forty feet, wide, laid out at right angles, and lined with ten thousand



COLORADO COLLEGE BUILDINGS.

shade-trees. In the centre is a fine park, and in every direction are delightful drives for pleasure-seekers and invalids.

The city has the modern improvements, as water-works, sewers,

gas and electric lights, telegraph, telephone, mail delivery, electric street railway, etc. Drinking-water is brought from the mountains, pure, sparkling, and delicious. Three banks, two daily papers, graded schools, a college, churches of different denominations, and several hotels and large boarding-houses, are among its live institutions.

"Colorado College" is located here. Its fine buildings are of the beautiful lava rock and red sandstone, and cost about $100,000. This institution stands for the best collegiate training, and offers its advantages to both sexes. It draws its students from the Southwest, from the Interior, and even from the East. The college is situated on a spot where antelopes were grazing and scalps were taken a few years ago.

The town has twenty-five miles of shade-trees. Irrigating streams distribute water through all the streets. Fine public buildings and costly business blocks adorn the city. Three private residences built of stone cost $90,000; the new High School building, $80,000; the Deaf, Dumb, and Blind Asylum, $100,000; the Opera House $75,000. The Childs-Drexel Home for Union Printers will cost $50,000. Pike's Peak, fourteen thousand feet above sea, stands not far off, and the foot-hills are near the town. Glen Eyrie, Williams Cañon, the Garden of the Gods, Manitou Mineral Springs, Ute Pass, and Cheyenne Cañon (now nearly all reached by the electric street-car system) attract tourists from all the world. Any one of these resorts would make the fortune of a watering-place in the East. Of this neighborhood, Professor Hayden says: "The scenery is grand, beyond any that I have ever seen in the vicinity of any other medicinal springs."[1]

THE PACIFIC SLOPE.

The discovery of gold in 1848 was the making of California. The growth and enterprise of its two large cities — San Francisco and Sacramento — are indeed marvellous. In less than fifty years, the population of the former has grown to over three hundred thousand, and the latter to nearly thirty thousand, the aggregate of their business being almost fabulous. The completion of the Union Pacific Railroad established a direct route for travel and commerce, by the way of San Francisco, to China, South America, Sandwich Islands, Australia, New Zealand, and other countries, so that imports from those foreign countries can be transferred from the carrying vessels

[1] Report of U. S. Geological Survey.

to the cars of the Pacific Railway, and taken through to Boston without change. Fifty large steamships now sail from the bay of San Francisco to different parts of the world, while hundreds of sailing-vessels are kept busy in the mighty commerce which has sprung up where forty years ago there was none.

In art, science, schools, literature, learning, and religion, these young cities vie with the most famous cities of the East. A more intelligent, enterprising, refined, and prosperous people cannot be found on the globe. Their tact, ability, energy, and indomitable perseverance are stamped upon their institutions.

August 1, 1867, San Francisco contained a population of 131,000, about 40,000 of them being twenty-one years of age and under. The number of school children at that time under fifteen years of age was 34,710. The year ending June 30, 1867, 1,050 buildings were erected in the city, 340 of which were brick. Cost of improvements for the same time was $9,000,000. The sales of real estate for the first seven months of 1867 were $10,000,000, and $1,000,000 were laid out on the streets and highways.

That the spirit of enterprise had risen to high-water mark at that time is manifest from the elegance and cost of some of the public buildings erected, as follows:—

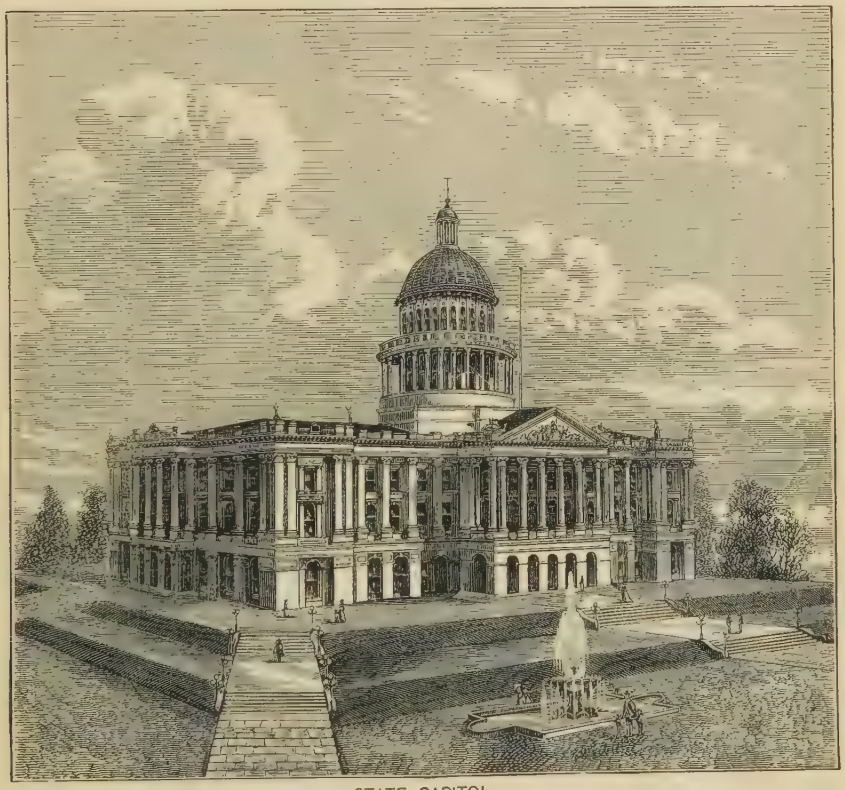
Bank of California, $275,000; Mercantile Library, $110,000; Merchant's Exchange, $190,000; Oriental Buildings, $200,000; Blonding and Pringle's Block, $70,000; Hayward's Building, $90,000; Savings Union Building, $50,000; Trinity Church, $75,000; Murphy, Grant & Co.'s Block, $170,000; enlargement and improvement of Lick House, $175,000; Dr. Scudder's Church, $64,000; Almshouse, $60,000; additions to Occidental Hotel, $125,000.

Seven years previous to the aforesaid date, the school population increased three hundred per cent in seven years; and during the year mentioned, eight commodious schoolhouses were erected. At that time, also, there were seventy private educational institutions, in which there were 4,250 students. That religious instruction kept pace with the intellectual, on the whole, appears from the fact that, connected with the many churches, were about fifty Protestant Sunday-schools in which nearly seven thousand pupils were taught, and more than four thousand in the Catholic and Hebrew schools. The Sabbath-school libraries of the city at that time contained 37,927 volumes.

Their generosity and large-mindedness appear in their noble plans and work for the present and coming generations. Perhaps in no

way can we exhibit these elements of character so plainly as we can by illustrations of their public works.

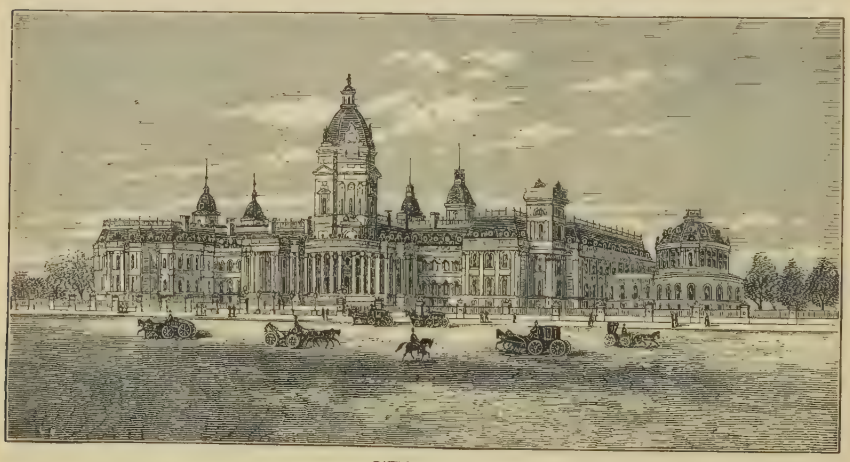
"The State Capitol is one of the first objects which meets the eye when approaching Sacramento from the east. It is a conspicuous landmark. The building occupies the centre of four blocks, bounded by Tenth and Twelfth, and by L and N Streets. The grounds form three terraces, slightly elevated above each other, and connected by easy flights of steps. They are regularly laid out, and covered with a



STATE CAPITOL.

beautiful sward, closely shaven by the lawn-cutter. They are interplanted with shrubs and evergreen trees. The outer border of the lowest terrace is studded with flowers. Its front is toward Tenth Street, and is three hundred and fifty feet long. Approaching it from this point, you may regard it as a great central building, from which rises the lofty dome, and having on each side a large wing. A flight of granite steps, twenty-five feet high by eighty feet in width, leads to a front portico of ten columns, through which, and a large hall, the

rotunda of seventy-two feet diameter is found in the centre; and from this, in each story, halls, elegantly arched, extend through the front and wings,—the state offices being on either side. Five female figures ornament the front above the columns. The central one is standing; the remaining four are in sitting postures. They represent war, science, agriculture, and mining. The wings, forming the flanks of the building, are one hundred and sixty-four feet above the first or basement story. The north and south flanks of the building form, respectively, the Assembly and Senate Chambers, the former being eighty-two by seventy-two feet, and the latter seventy-two by sixty-two feet. In the rear centre, a circular projection of sixty feet diameter forms the State Library. The first story, of twenty-five feet,



CITY HALL.

is of white granite, from neighboring quarries, and is surmounted by a cornice of the same. Above this, the body of the main dome is surrounded by an open balcony, which is supported by twenty-four fluted Corinthian columns and an equal number of pilasters. Above this balcony, the body of the dome is supported by an equal number of ornamental pilasters. From these rises the great metallic dome. From the top of this dome, in turn, rise twelve fluted Corinthian pillars, which support the final or small dome, and this is surmounted by the statue of California.

"The whole interior is one solid mass of iron and masonry. The dome of the interior rotunda, which is of iron ornaments and brickwork, is exceedingly handsome. The panels and pedestals under the windows are of the beautiful laurel,—well known in California for

its susceptibility to receive a high polish. All the first-floor doors are of walnut, with laurel panels; as are also the sashes throughout the building. The stories are, respectively, twenty-one feet six inches, twenty feet, and eighteen feet in height. It covers, with its angles, nearly sixty thousand surface feet of ground, and measures over one thousand two hundred lineal feet round in all the angles."[1]

San Francisco can show a larger number of costly and elegant public buildings than most of Eastern cities. Perhaps none of her

PALACE HOTEL.

structures, however, awaken the pride of a genuine Franciscan like the famous City Hall, which cost *five million dollars*. The illustration shows the reader that it was planned on a grand scale, and carried to completion in accordance with the highest rules of architecture. A view of it suggests to the observer, enterprise, foresight, public spirit, and generosity on the part of tax-payers, and accommodation, convenience, utility, and comfort for the busy officials of the city government. It is both an ornament and honor to the city.

[1] Crofutt.

Palace Hotel is the largest hotel in the world. It occupies one entire block, three hundred and forty-four by two hundred and sixty-five feet. It is seven stories high (one hundred and fifteen feet). It is built in the most substantial manner. The foundation-walls are twelve feet thick, — all others ranging from one and one-half to four and one-half feet in thickness. "The foundation-walls, at their base, are built with inverted arches. All exterior, interior, and partition walls, at every five feet, commencing from the bottom of the foundation, are banded together with bars of iron, forming, as it were, a perfect iron basket-work, filled in with brick. The quantity of iron so used increases in every story towards the roof; and in the upper story the iron-bands are only two feet apart. The roof is of tin, the partitions of brick, and the cornice of zinc and iron. Besides the city water-works, a supply of water comes from four artesian wells of a ten-inch bore, which have a capacity of twenty-eight thousand gallons per hour. A reservoir is located under the central court, capable of holding six hundred and thirty thousand gallons. On the roof are seven tanks, which hold one hundred and twenty-eight thousand gallons. The hotel is supplied with two steam force-pumps for water, two additional for fire, and five elevators." The whole cost of the structure was *six million five hundred thousand dollars.*

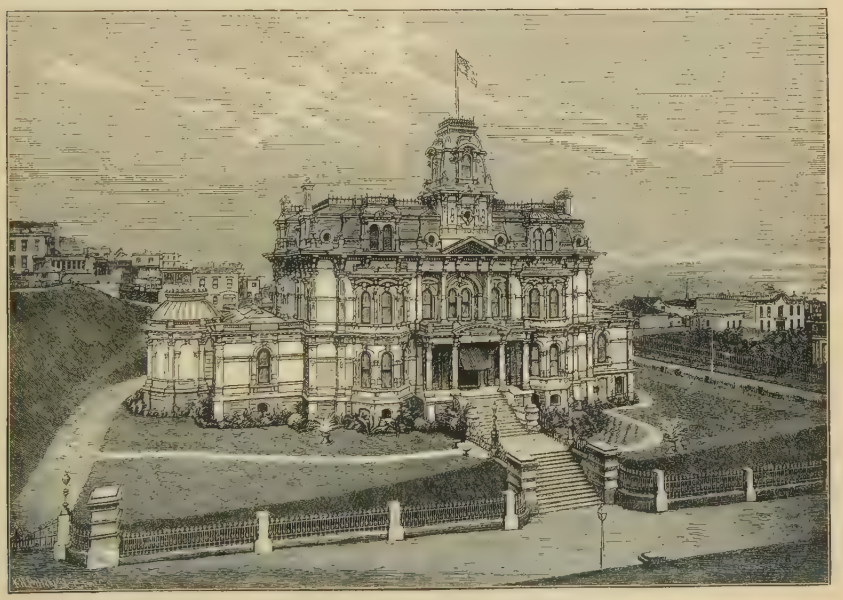
Golden Gate Park is one of the largest and finest parks in the world. It contains over a thousand acres, and is laid out in the most tasteful and charming manner. The conservatory is an extensive and imposing structure, admirably arranged for the purposes for which it was reared. Of all the great parks of the world, this is said to be the most picturesque and delightful. Its resources for variety of arboriculture are many and great. Nearly all semi-tropical fruits grow luxuriantly in it, thus affording one of the most interesting features possible in a park, — trees and shrubs of many climates growing together in wondrous beauty. It is located on the shore of the bay, another attraction that challenges description. Tree-planting and general improvement is constantly advancing at an annual outlay that would make the tax-payers of some eastern cities exceedingly nervous.

San Francisco is noted for its palatial residences. That of the late millionnaire, Charles Crocker, is one of the most expensive and attractive dwelling-houses in our country. It is large enough and good enough for a king. Indeed, a king built it, — one of the kings found among the sovereign people of America, where all are sovereigns. Outside, inside, and surroundings are as complete and near perfec-

tion as money could assure. It is a study in architectural plans and finish.

The Lick Observatory, situated on Mount Hamilton, about fifty miles from San Francisco, was the gift of James Lick to the University of California. The illustration on the following page furnishes a view of the observatory and the residence of the astronomers.

Mr. Lick was a singular man, avaricious, selfish, unamiable, and eccentric. His final disposition of his estate, amounting to four million dollars, was a surprise to everybody. He was the last man of whom the public would have expected large bequests; and the



RESIDENCE OF CHARLES CROCKER.

last, too, from whom certain benevolent societies would have expected munificent gifts. His most intimate friend would not have dreamed that astronomy would receive even a moiety of his estate. But this proved to be his pet science, and he bequeathed seven hundred thousand dollars to this object. He willed one hundred thousand dollars to establish "The Old Ladies' Home" at San Francisco; one hundred and fifty thousand dollars for the erection and maintenance of public baths; one hundred thousand dollars for a group of bronze statuary representing the history of California, to be erected at the city hall of San Francisco; five hundred and forty thousand dollars for the establishment of a school of mechanical arts; with

many smaller legacies to individuals and organizations. He must have been a patriotic man, for he left sixty thousand dollars for a bronze monument to be erected in Golden Gate Park, San Francisco, "to the memory of Francis Scott Key, author of the song, 'The Star-Spangled Banner.'"

A romantic story is told of his early life. He fell in love with a miller's daughter, who responded gladly to his attentions at first, but her father opposed the match. Young Lick was not a favorite of his.

LICK OBSERVATORY.

Finally he relinquished the idea of wooing the maiden, but resolved that he would beat the irrepressible miller some day on a mill. That was in Fredericksburg, Penn., from which place he drifted away, lived for a series of years in Buenos Ayres and Valparaiso, whence he removed to California in 1847. There, near San José, he erected his mill to beat the Pennsylvania miller. It cost him two hundred thousand dollars. It was finished in the most costly California woods, highly polished, and was, indeed, the most expensive mill ever built. The Pennsylvania miller "had gone before" when the

purpose of Lick was accomplished, but the latter enjoyed it all the same.

Mr. Lick selected the spot on which the observatory should stand, and it was inaccessible at the time. The United States government owned the land, and Congress granted sixteen hundred acres of it for the uses of the observatory. The county of Santa Clara, in which Mount Hamilton is, fulfilled another condition of Mr. Lick's will, and built a road to the summit at an expense of seventy-five thousand dollars. This road is twenty miles in length, and is called Lick Avenue, one of the finest avenues in all the West.

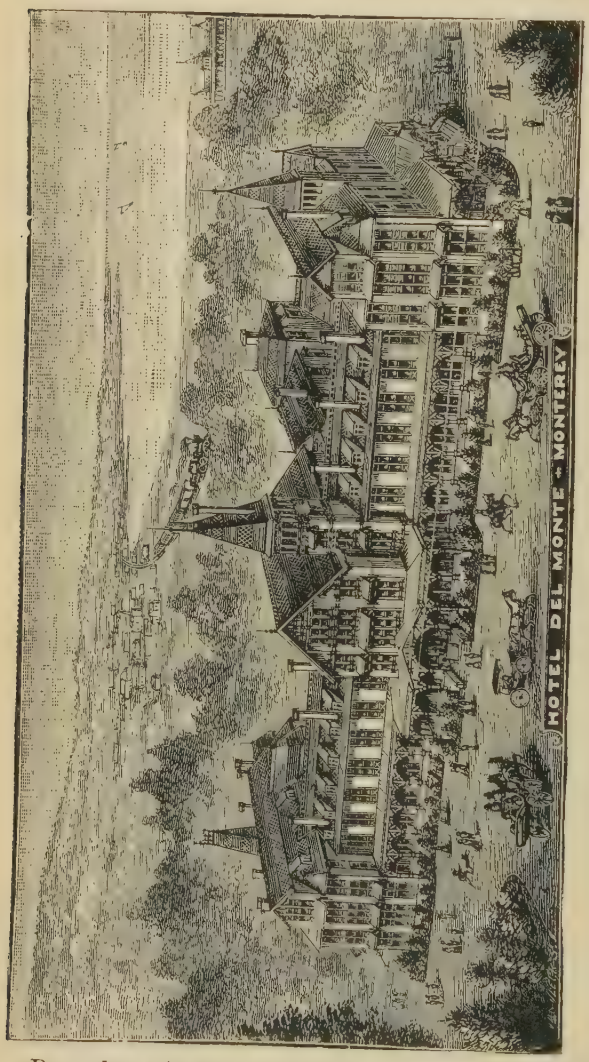
The will required for the observatory "a powerful telescope, superior to and more powerful than any telescope yet made." Such a telescope was made in Cambridge, Mass., and it was put in position at once for the use of the astronomers. One who has travelled this avenue says: "The grade in no place exceeds six feet and three-quarters in one hundred feet. There is no part of it where a carriage team cannot trot comfortably up the grade."

Work on the Lick Observatory began July 23, 1880, and a great work it was: for every sort of material used, as well as tools, — even food and water, — had to be transported to the top of the mountain. Subsequently, however, a spring was discovered three hundred and ten feet below the summit, and a bed of brick-clay eight hundred feet below, all of which were utilized. As soon as possible, a reservoir, capable of holding three hundred thousand gallons, was constructed on the highest peak, by excavating a solid rock.

The observatory is two hundred and eighty-seven feet in length, — a transit-house, meridian circle, a photo-heliograph and heliostat, and a photograph-house. The main building stands nearly due north and south, and fronts the west. The location for astronomical purposes is the best possible. The observatory was completed sometime in 1888.

California boasts several remarkable health resorts, to which thousands of invalids and tourists go. One of these is Monterey, an ancient town, built almost entirely of adobe. Monterey early became the capital of the Territory; and many of the governors under Spanish, Mexican, and American rule made it their homes. The town is situated upon the slope of a hill overlooking the beautiful bay; and one mile distant, in a magnificent grove, stands the famous Hotel del Monté. Its style is Gothic; and it cost *two hundred and fifty thousand dollars.* The grounds embrace one hundred and twenty-six acres, the most of them laid out in lawns and gardens filled with the

rarest flowers. Forty or fifty trained gardeners are kept at work, under the directions of Mr. R. Ulrich, beautifying this charming park. The bathing-beach is inferior to none in the world; and, to accommodate visitors who need a warmer temperature than the surf affords, a luxurious swimming-bath has been erected, at an expense of *seventy-five thousand dollars.* The hotel itself is an artistic and imposing structure, elegantly furnished, and ably conducted. To supply the hotel and estate with water, Carmel River was tapped, and the water brought in pipes, at an expense of more than half a million of dollars.



This hotel was destroyed by fire in 1887—supposed to be the work of an incendiary—and was immediately rebuilt on a more expensive plan at a cost of one hundred and fifty thousand dollars more than the original structure.

Passadena is a beautiful location eight miles from Los Angeles. It has become a very popular health resort, possessing some characteristics that do not belong to other resorts of California. Eastern people of wealth have gone there in search of health, and have erected fine residences, surrounding them with orange trees and the

rarest flowers, converting the place into an earthly paradise. Upon the most commanding eminence stands the new hotel, — "The Raymond," — erected at an expense of *three hundred thousand dollars*,

THE RAYMOND.

and opened in November, 1886. The main building is two hundred and eighty-seven feet long, facing the south. A veranda, fifteen feet wide, extends around nearly the whole structure, affording a continuous promenade of a quarter of a mile. An elevator runs from the

cellar to the observatory. The house is elegant in every particular, and is provided with every modern convenience, — gas, telephone, telegraph, postal facilities, etc. It is erected by the Raymond Excursion Company, whose parties make it their winter quarters; and splendid quarters they are.

We shall close this third department of our work by calling attention to a marvel of a public house in New Mexico.

Las Vegas Hot Springs derives its name from the town of New Mexico, in which it is situated, — a place of ten thousand inhabitants. The hotel is one of the finest structures of the kind in the

HOTEL, LAS VEGAS HOT SPRINGS.

United States, and takes the place of the noted "Montezuma," which was burned in January, 1884. It occupies another and more commanding location on the side of the mountain. It is constructed of solid stone, and is as nearly as possible fire-proof. It contains three hundred rooms furnished in the finest style of which modern art is capable, and while varying in style and decoration, one room is about as good as another. The ladies' and gentlemen's reception rooms are large and elaborately finished in hard woods, and elegantly furnished. There is a general and beautiful parlor on each floor. The carpets were made to order, after original designs, without regard to expense, and the window draperies are a superb match for the carpets.

One angle of the building is ornamented with a tower, from the various stories of which the grandest views of nature are taken in. Around the front and sides of the building are wide balconies, furnished with every sort of an easy and invalid chair invented for loungers and patients.

The grounds are ample and beautifully laid out, with the attractions of a museum, aviary, zoölogical collection, green-house, etc. Postal, telephone, and telegraphic connection with the outside world are complete.

Invalids, tourists, and pleasure-seekers from all parts of the United States, and even from foreign countries, are the patrons of this magnificent hotel, which is six miles by rail from the centre of the town.

Such is a bird's-eye view of the almost incredible progress of the New West. No "wilderness and solitary place" was ever so speedily transformed into a populous and thriving country before. Consult the map of the New West as it was, with the "Great American Desert" stretching hundreds of miles over its vast territory in painful desolation; and contrast it with the map of the New West as it now is, interlaced with railway track, peopled by the most adventurous and enterprising men and women from every quarter of the globe, dotted with populous and wealthy cities that have grown into power and beauty as if by magic, commerce appropriating every mountain and valley, lake and river to its mighty growth, and Christian civilization crowning the whole with the benediction of Almighty God. Such another marvel is not found on the face of the earth, so unique, so original, so magnificent. Some one has said that thirty years ago a railroad over the Rocky Mountains to the sea was only an *idea*, while the "Great American Desert" was a *fact;* but now the idea is a stubborn fact, and the Desert has ceased to be. Marvellous transformation! An empire of magic, bedecked with jewels and crowned with gold!

Nor can we stop here. Imagination attempts to portray the scene when fifty and a hundred years more of progress have passed away. When all the public lands are appropriated to the growing industries; when the inventions and discoveries of art and science have enabled human enterprise to swell the harvest of precious metals to untold millions; when a teeming population dots the vast domain with towns and cities that surpass their sister municipalities of the East in wealth and enterprise, and when learning and religion have founded the finest schools and universities, and reared the costliest temples for the worship of God from the banks of the Missouri

to the Pacific Slope, then will the dwellers in our land, and other lands, behold here a national growth and consummation without a parallel in human history.

THE MORMON SETTLEMENT.

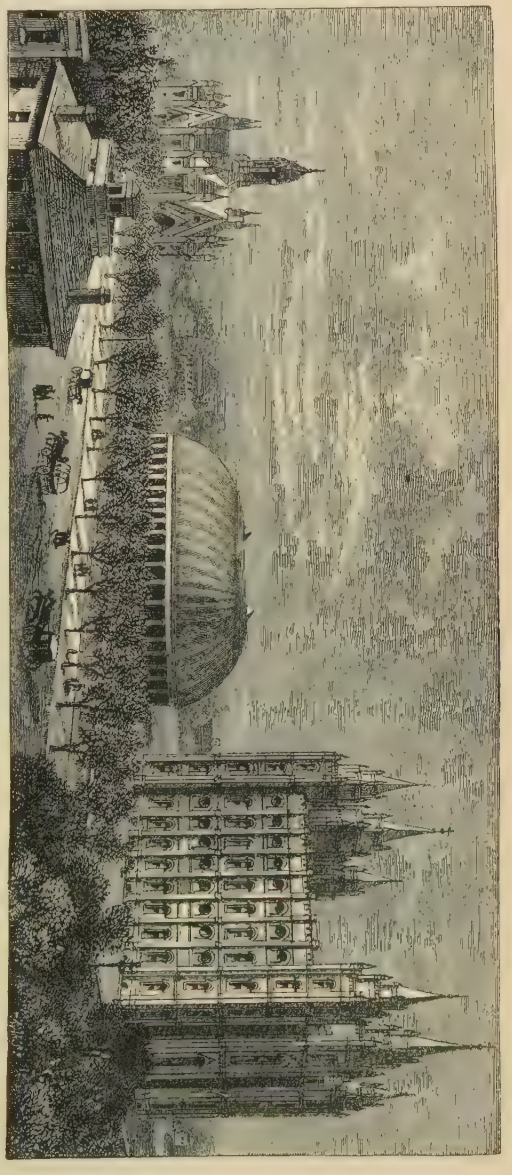
Whatever may be said of the immoralities and corruption of the Mormon system, as a business enterprise it is conceded to be a marvel. The sacrifice, courage, and indomitable spirit incident to a journey over the Rocky Mountains to Utah fifty years ago, for the purpose of colonizing in the "vast wilderness," so remote from civilization that Gentile interference would be quite impossible, is sufficient evidence of zeal and daring enterprise.

Salt Lake City, or "Zion," as the city is called by many Mormons, has a population of about forty thousand. It is a beautiful city, handsomely laid out, with wide streets running at right angles and lined with thrifty shade trees. Irrigating ditches lend a charm to the town, by distributing the clear, pure, sparkling Rocky Mountain water through all the streets. Large public buildings and costly business blocks adorn the city, and everywhere there is the appearance of thrift and enterprise.

The illustration on the following page exhibits Assembly Hall on the left, the Tabernacle in the centre, and the new, expensive Temple on the right. The Tabernacle is an immense building, two hundred and fifty feet long, and one hundred and fifty feet wide. The roof is supported by forty-six columns of cut sandstone, and is the largest self-sustaining roof in the United States, with the exception of the Grand Union Depot of New York. The ceiling of the roof is sixty-five feet above the floor. At one end of the building is the largest organ in the country, with a single exception. The audience room will seat eight thousand people. The Temple is a mammoth structure, and was erected without regard to the expense. It is located on the eastern half of the same block with the Tabernacle. The dimensions of its foundation are $99 \times 186\frac{1}{2}$ feet. The building is two hundred feet long, and one hundred feet wide. The foundations are laid sixteen feet below the surface of the earth, and are sixteen feet in thickness. The walls are nine feet and nine inches thick, built of light-gray granite. The three towers on each end of the building are very graceful and ornamental, the two central ones rising two hundred feet, containing a circular stairway winding around a column four feet in diameter.

The corner-stone of this building was laid April 6, 1853, with the expectation that thirty years would be required to complete it. Its cost was nearly *four million dollars*. Like the Tabernacle, it is one of the most remarkable public buildings on this continent.

Mormon business is conducted on the co-operative plan, — one great company being organized to purchase goods in large quantities for all the Mormon settlements. This company bears the name of "Zion's Co-operative Mercantile Institution." Its head-quarters are in Salt Lake City, in an immense building of brick, three hundred and eighteen feet long by fifty-three feet wide, three stories above the cellar. An addition to this building, twenty-five by one hundred and ninety-five feet, used for a warehouse, has been erected at an expense of $175,000. The business transacted here annually amounts to *millions of dollars*.



ASSEMBLY HALL, TABERNACLE, AND TEMPLE, SALT LAKE.

As an agricultural community, the Mormon settlement has proved a great success. By means of irrigation, the Mormons have made the desert to blossom literally as the rose, — "Jordan Valley" is

transformed into a garden of wondrous beauty. Beyond the fondest dream of thrift and plenty, a wealth of products rewards the husbandman for his labors to reclaim these desert lands.

That such a city and such a people should exist to-day, where, forty years ago, for a thousand miles around, there was not a civilized abode, is a marvellous fact. Should another forty years achieve an equal advance throughout that grand mountain domain, the reality will challenge the wonder of mankind.

RAILROAD KINGS.

We add to the foregoing marvels of enterprise, the portraits and brief biographies of seven Railroad Kings, — public men who have contributed largely to the progress of the New West, by constructing railroads. Some of these life-sketches are given just as they have been published to the world before ; others have been prepared from reliable data for this volume. All of them are marked examples of industry, perseverance, tact, enterprise, courage, and integrity, which the young men of our country may study with profit ; for each one of them was "the artificer of his own fortune."

Mark Hopkins (deceased) should have been included in this list of Railroad Kings, and we spared no pains to secure his portrait and life-sketch ; and, after all, failed. It is only left for us to say that he was a railroad king.

OAKES AMES.

Oakes Ames, eldest son of Oliver and Susannah Ames, was born in Easton, Dec. 10, 1804. His father removed from Bridgewater to Easton in 1803, because the water-power there was better for his business, — the manufacture of shovels. He purchased a farm, also, on which Oakes worked more or less as soon as he was old enough, and that was very early. Subsequently he assisted in the shovel factory when he was out of school, as inclined to industry as he was to obedience.

District schools were short and poor, but Oakes got more out of them than many boys, on account of his thoughtfulness and application. He went to school to learn — and he learned, as he went into the shop to work — and he worked. Until he was sixteen years of age, he had no opportunities for education, except what the district school furnished. Then he attended Dighton Academy a few

RAILROAD KINGS.

months, as a kind of conclusion to his education, when he entered upon his life-pursuit in the shovel factory.

Oakes was a large, stout boy, full of life and energy, willing and ambitious. He progressed rapidly in shovel-making, and soon made himself indispensable to his father's business. On reaching his majority, or soon after, he became superintendent of the factory, in which position he won the confidence and respect of all the employees.

In 1844, his father became sixty-five years of age, when he withdrew from active participation in the business, and the two sons, Oakes and Oliver, became the sole managers; and the firm was known as Oliver Ames & Sons. From year to year their business extended, until they employed nearly five hundred men; and one thousand tons of iron, two thousand tons of steel, and five thousand tons of coal passed annually through their hands, in the manufacture of shovels. Their manufactures were always first-class. In every market the trade-mark of the company was recognized as the synonym of honest and thorough work. A shovel was a shovel, good and true. There was no approximation to sham production in the establishment. At the dedication of the "Oakes Ames Memorial Hall," presented by his sons to the town of Easton, Judge Thomas Russell said: —

"A Boston merchant told me that he made a wagon journey of a thousand miles in South Africa, and among all the Boers and Bushmen and half-breeds, he never found men so ignorant, or kraals so small, that they didn't have and appreciate Ames' shovels. To them the mystic letters 'Oliver Ames & Sons' meant honest materials and faithful work. It was more wonderful because they were not used to it. From another quarter they receive guns that go off at the wrong time and at the wrong place; rum that will neither cheer nor inebriate (that wouldn't trouble any of this family); knives that will not scalp — no, not even scalp a railroad ticket. It is pleasant in this age of shams, to know that at the Cape of Good Hope, in Australia, in New Zealand, at the ends of the earth, and in the farthest islands of the sea, this old Massachusetts brand, — this Old Colony brand, — stands all the world over for thorough work, tough as ash and true as steel."

Even his shovels praised him.

Judge Russell's remark in parenthesis was a tribute paid to the temperance principles of the firm, clear back to the father. Oakes Ames was a teetotaler, and a most uncompromising foe to the saloon. An eye-witness informed us, that, at one time, when he was

a member of the State Department, the officers visited the public institutions. At one of them, the superintendent flung open a cupboard door, where intoxicating liquors were displayed, and invited the company to drink. Oakes Ames was indignant. Instead of accepting the invitation, he expressed his surprise that State officers should be invited to drink in an almshouse. "Four-fifths of the inmates are brought here through drink," he said, "and it is a disgrace and shame that liquors are brought in here at all." And he went on, pouring out invective upon the curse of strong drink, until the superintendent hung his head, and the whole company declined his invitation. My informant said, that, in consequence, the liquors were all cleaned out of the institution.

In 1860, when the country was on the eve of an unparalleled civil war, Oakes Ames was elected to a place on the governor's council. Every one who knew him, said, "He is just the man for Governor Andrew's cabinet." In this way he was introduced into political life. The war came on; and Governor Andrew said, "He should be sent to Congress, where the wisdom and patriotism of such men are needed in this crisis." The voters of the second district thought as Governor Andrew did, and, by a triumphant vote, sent him to the Thirty-Eighth Congress. For ten years he continued to fill the position with marked ability and fidelity.

In July, 1862, Congress passed an act authorizing the construction of the Union Pacific Railroad. Mr. Ames was deeply interested in the project. But capitalists had too little faith in the enterprise; they withheld their capital. Two years later, the whole thing came to a stand-still, and was in danger of absolute failure, for the want of brains and enterprise. Oakes Ames was besought to interpose and save the road. President Lincoln entreated him, members of Congress urged him, public men, in different parts of the country, importuned him. Finally, he was fairly persuaded to undertake the Herculean task. This was in the autumn of 1865; and from the moment he consented to prosecute the mammoth enterprise, — greater than any American citizen had undertaken before, — the anxious public felt assured that the Union Pacific Railroad was an established fact. When President Lincoln had signed the contract for building the road, rising from his seat, and throwing his right arm over the broad shoulder of Ames, he said, "Your name, Mr. Ames, will live longer in history than mine."

We have no room to record the labors and sacrifices of Mr. Ames in the construction of the road. It was completed in about three

years, — seven years less time than the government allowed in its contract. General Butler said: "Without him, I am of the confident belief that that great link which binds the East and the West together, in the bond which we all trust will never be severed, would not have been made in this generation, if at all. . . . With an energy never faltering, with a directness never swerving, with a faith never failing, he stood behind it, pushing it forward, with the belief that it was as necessary for the unification of the country as was the successful termination of the war itself."

Senator Dawes said, in the United States senate-chamber: "I have a colleague who has adorned his calling through a long life of industry; who has carried greater loads upon his shoulders, and worked out greater problems in the development of the resources of the country than any man connected with the material interest or enterprise in the whole United States. A grateful nation will yet rear his monument, and its inscription will be, THE BUILDER OF THE UNION PACIFIC RAILROAD."

We have no heart to narrate the trials inflicted upon him by the cowardice and corruption of political demagogues, in the name of the Credit Mobilier. That record is one of ingratitude and shame on the part of truckling politicians, incapable of understanding how a statesman can execute a great national trust, in which the realization of a fortune is possible, and be honest. To cast aspersion upon a public man, when, down in their heart of hearts, they believed Oakes Ames incapable of dishonesty, is a crime of the darkest hue; and that was the crime of a majority of the members of Congress in 1873.

A member of Congress said in a speech: "At the hour when nearly one-half of this Union was struggling to overthrow the other, when the earth resounded to the tramp of armed men in the field, in the darkest hour of our fortunes, Oakes Ames came forward, and placed down *eight hundred thousand dollars* as his subscription, to send the railroad across the continent that should hold the East and the West together, because he had seen the North and the South struggling to separate.

"I have seen him when bankruptcy and ruin fell upon him, because he had taken part in this great national work. I have seen him crushed down to earth with obligations and debts not incurred for himself, but in the service of his country; and yet such was the force of his honesty and integrity of character, that each and all of his creditors gave him extension of credit, and every one has been paid to the uttermost farthing. It is to his credit that he had to

absent himself from your committee while investigating his honesty, to go home and do the last act of an honest man, by paying up the last dollar of his extended debt. Such is Oakes Ames."

The sons of Oakes Ames, in their beautiful memorial volume, address the reader in the following fitting paragraph : —

"Have the detractors of Oakes Ames ever asked themselves what motive, except public spirit, could have led a man so situated to contract to build the road? His own personal interest in the construction company, in December, 1867, was only one-eighth of the whole. By signing the contract, he made the entire risk his own. But, in case of profit, seven-eighths of the profit would belong to others. Why, except from public spirit, should a man worth millions, and secure in the possession of them, have risked all by becoming personally responsible, as he did, for the vast sum of forty-seven million? Why else should he have undertaken to find a market for the securities of the road, and to convert them into money with which to meet these immense obligations? Why else should he have given the best years of his life to these colossal cares and responsibilities? For the prosperity of his country, he risked his own fortune and that of his family, and up to this hour his return has been, in too many quarters, unmeasured reproach and odium."

At the dedication of the Oakes Ames Memorial Hall already alluded to, the president of the Massachusetts Senate said: "Better than these is the consciousness which we have of the worth and nobility of character of Oakes Ames. His proudest and most perfect monument is in our hearts, in our deep sense of what he was. When we think of his massive mould of heart and spirit no less than in body, of his strength and simplicity, of his inflexibility and patience amid great undertakings and the heaviest difficulties; when we remember the amplitude of the unselfish works accomplished by him for mankind, we say of him : —

> 'Such was our friend; formed on the good old plan,
> A true and brave and downright honest man.'

Such a monument will indeed endure. Every memento which affection can rear may pass away; the most enduring work of human skill to his memory may perish; from the tablets on the Sierras his lineaments will crumble and fade and disappear; while continually in the generations to come, —

> 'Death will mould in calm completeness
> The statue of his life.'"

OLIVER AMES.

Oliver Ames was a worthy and noble brother of Oakes Ames. He was the third son of Hon. Oliver and Susannah Ames, and was born at Plymouth, Mass., Nov. 5, 1807. He was seven years old when his father removed to Easton,[1] where he lived until he died, March 3, 1877. He was old enough to render some assistance in the shovel factory which his father established, so that, from the day he became a resident of Easton, his time was divided between school and the factory. A busy boyhood and youth was his, both from inclination and paternal instruction. His obedience and industry left no time for idleness. All his time belonged to study or labor. He loved books; and the schoolroom was always an inviting place to him. He loved work, also, and the shovel factory had attractions for him. His marked tact and intelligent comprehension made him a skilled workman while yet in his youth. Before emerging from his teens, he could make, with his own hands, as fine a shovel as any workman in the establishment. At the same time, he was an extra scholar, and possessed a strong desire for a collegiate education. It was not, however, until 1828, after being disabled by a serious accident, that he seriously thought of a college course of study. It was feared that his injury might prove permanent; and this fact brought the subject of Oliver's liberal education to the front. It was discussed at the family fireside, and the final decision was that he should go to college. So he entered an academy at North Andover, Mass., designing to prepare for college, and finally enter the legal profession, for which his friends thought he possessed decided talents.

After eighteen months had elapsed, for sufficient reasons, his plans were changed, and he entered the law office of William Baylis, Esq., of West Bridgewater, as a student. Close application to study, together with a constitution that required an active rather than sedentary life, soon told upon his health. Physically he broke down; and, to his very great disappointment, was compelled to relinquish the idea of a liberal education. He returned to the shovel factory, instead of going to college, and there achieved success, which he shared, through his large wealth, with the public.

He married Sarah, daughter of Hon. Howard Lothrop, of Easton,

[1] His father had removed from Easton to Plymouth to start a new enterprise, still continuing his business in Easton, to which place he returned in 1814.

in June, 1833; and, in 1844, he entered into partnership with his father and brother Oakes, under the name of "O. Ames & Sons." He was a thorough business man, and devoted his energies, with unremitting diligence, to the success of their manufactures. At the same time, his love of learning did not allow of his divorce from intellectual culture. Moments that he could snatch from the claims of a large and growing business were given to mental improvement.

He was not over twenty years of age when the temperance cause enlisted his sympathies, and he took the ground of total abstinence, as a matter of principle. Nor was he any more decided on this question than were his father and brother. All of them saw the curse of drink to the laboring class; and they united their efforts to expel intoxicating liquors, not only from the factory, but from the town as well. When prohibition came, they were prepared for it, and hailed it as the harbinger of thrift and peace to the workingman's home. They supported prohibitory legislation, also, as necessary to the order and success of a manufacturing town. The repeal of the prohibitory law, in 1868, and the substitution of a license law, gave them an experience out of which, in reply to an inquiry, they made the following statement to the public: —

"We have over four hundred men in our works here. We find that the present license law has a very bad effect upon our employees. On comparing our production in May and June of this year (1868) with that of the corresponding months of last year (1867), we find that, in 1867, with three hundred and seventy-five men we produced eight (8) per cent more goods than we did in the same months in 1868 with four hundred men. We attribute this large falling off *entirely* to the repeal of the prohibitory law and the great increase in the use of intoxicating liquors among our men in consequence."

The heart, hand, and purse of Oliver Ames were enlisted in the advancement of the temperance cause. Several times we were a witness to his annual subscription of *one thousand dollars* to aid a single State temperance society in its noble work.

He was first a Whig in his political connections, then a Republican, deeply interested in every question pertaining to the abolition of slavery and the prosperity of his country. He was a member of the State Senate in 1852 and 1857, distinguished for his clear, sharp discrimination on public questions, and non-partisan spirit. He was ready in debate, earnest and direct, and never failed to hold his hearers to the close. He often spoke in public on political questions of the hour; and few speakers ever carried conviction with more cer-

tainty to his hearers than he, although he laid no claim to oratory.

In 1855, the O. Ames & Sons built the Easton branch railroad; and from that time their attention was called to the railroad as an important factor in the development of the resources of our country. So that, when the Union Pacific enterprise had come to a stand-still, with a fair prospect of its being abandoned, these patriotic and enterprising brothers came to the rescue. We have heard Oliver say that when Oakes first disclosed to him his purpose concerning this transcontinental railway, he promptly discouraged the undertaking, because of the immense business that was already taxing their energies to the utmost. But the unselfish and patriotic devotion of his brother to the enterprise, and the critical demands of the hour, soon removed every objection, and the brothers were one in a settled determination to complete the road. From 1866 to March, 1871, Oliver Ames was president of the company. Another says: "His sound judgment, business capacity, and inflexible honesty were of immense service in carrying this great enterprise safely, through difficulty and peril, to final success."

Public confidence in Oliver Ames was unlimited. His wisdom, efficiency, and integrity were sought by great enterprises and philanthropic institutions. He was President of the National Bank of Easton, the Ames Plow Company, and the Kinsley Iron and Machine Company. He was a director, also, in several banks, including the Bristol County National Bank. He was a director, too, in the Union Pacific, Atlantic and Pacific, Kansas Pacific, Denver Pacific, Colorado Central, Old Colony and Newport Railroads, not to mention others. These are only a portion of the public trusts which he carried; for the cause of education, philanthropy, and reform, as well as agricultural, historical, and other societies, were continually taxing his attention and benevolence.

He was a Unitarian in his religious connections, constant in his attendance upon public worship, and for several years was a Sunday-school superintendent. He built and presented to his church in North Easton their beautiful house of worship, also their fine parsonage, corresponding in architecture with the church. At his death he left a large fund to keep the church and parsonage in repair, and another to improve the cemetery.

The news of his death spread sadness far and wide; for everybody who knew him wanted he should live. His simplicity, generosity, and purity of character endeared him to a host of friends in private

and public circles. When he died they realized the loss of a great benefactor and true friend.

Rev. L. H. Sheldon, an Orthodox clergyman of the town, preached a sermon to young men on the life and character of Mr. Ames, in which he held up the good man as a model for them to copy. We close this sketch with brief extracts from that noble tribute to the memory of an extraordinary man: —

"In a marked degree has the life of an honored citizen, just now closed, by its integrity, its generosity, its wisdom, its enterprise, its hearty and enlightened sympathy with the unfortunate of every class, and with the friends of education and religion, and by its love of truth and virtue and every manly and noble trait, presented to us, to the whole community, and to strangers from abroad, its great worth while enjoyed, and its great loss when taken.

"He needs no emblazoned tablet to set forth his virtues or sound his praise. Though dead, he lives in the works of national renown to which he gave his intellectual energy and his personal supervision; in the hearts of the people among whom he displayed his rare wisdom, his calm judgment, his business thrift, and his unquestioned integrity and generosity. Ah, yes! he still lives, and will live in the intelligence and virtue of the children whose minds and hearts shall be blessed by his munificent remembrance, as they enter the room for mental training; as they open the word of God in His courts, and sing the songs of Zion in the house of religious worship; or, as with solemn tread, they follow the remains of departed loved ones to their last resting-place, amid the quiet and the beauty that his own hand hath prepared. And once more: he will never die in that cherished home which his love, intelligence, and virtue ever adorned, sanctified, and sweetened, while the hallowed memories of the past, and the varied achievements of the present, remain as the reminders of the untold worth of such a character in its influence upon the dawning life of the young, to whose hands are committed the great and good works still to be sustained and perfected."

The last words of this beloved man were, "IT IS ALL RIGHT."

We only add, from a personal acquaintance with Oakes and Oliver Ames, we can truly say that no eulogy of such noble characters is extravagant.

The Union Pacific Railroad Company testified to their respect for Oakes and Oliver Ames, and their just appreciation of their public labors, by erecting a monument to their memory at Sherman. The following is an excellent view of it: —

MONUMENT IN MEMORY OF OAKES AMES AND OLIVER AMES.

Erected by the Union Pacific Railway Company at Sherman, Wyoming Territory, — the highest point reached by its railroad. Base, 60 feet square. Height, 60 feet. Summit, 8,350 feet above level of the sea.

C. P. HUNTINGTON.

A Connecticut boy of less than twelve years was employed by a neighbor to pile a lot of wood. The boy belonged to a family of children as numerous as they were poor, each one, at an early age, com-

pelled by force of circumstances to shift for himself. This was the lad's first job of any account. The wood was piled neatly in the shed, the chips gathered up, and the ground swept with an old broom, so that the proprietor exclaimed, when he saw the thoroughness of the boy's work: "Neat as a pin! Here's a dollar for you; and I think you must have the job next year." It was the annual winter's stock of wood the boy had put under cover.

He was delighted both with the dollar and with the praise; but on reaching home, he said to his mother, who was delighted with his success: —

"My feelings were divided between the dollar and contempt for the man, who thinks I shall be doing nothing better one year from now."

Not long thereafter this high-minded lad was ousted from the family nest by stress of circumstances, and went forth into the great world for his living. A checkered experience was his for a series of years, when we discover him running a hardware store in the young and far-off city of Sacramento. The sign over the store is *Huntington & Hopkins.* The former is the Connecticut boy who piled the wood; the latter was an equally aspiring Massachusetts boy grown into a man. They kept the best goods made, and sold them at a fair price. Principle governed their traffic in hardware. Their store was at No. 54 K Street.

Here Leland Stanford, a wholesale grocer, and the two Crocker Brothers, dry-goods dealers, often came to enjoy the company of the two congenial spirits in the hardware business. They discussed the "topics of the times," especially the needs and prospects of California. All of them were Republicans, which stood for more than almost any one dreamed of in 1860, the time of which we are speaking. Their store became the headquarters of Republicans, who often spent their evenings there, discussing the future prospects of the country.

"A Pacific railroad is the great need of California," said Huntington, "and, in my opinion, it is practicable." He had often expressed the same opinion to his partner. There were no dissenting voices in that group. Indeed, all the more intelligent and enterprising citizens of California believed in a Pacific railroad. They had succeeded in bringing the subject before Congress, though with no prospect of immediate success.

Just then there came a man to Sacramento by the name of Judah, to build the little "Sacramento Valley Railroad." He, too, became

enthused with Huntington's spirit for a railway over the Sierra Nevadas; and he borrowed money to defray the expenses for exploring for a pass. Again and again the frequenters at No. 54 K Street contributed to aid Judah in his engineering, with no definite and encouraging results. Huntington refused to give any more money for what seemed to him a profitless work; and he proposed a meeting at Stanford's house, and the five leading spirits were there, — Huntington, Hopkins, Stanford, and the Crocker Brothers. Two others were there, — Judah, who died soon after, and another citizen, who dropped out of the circle. The five named above became the originators of the Central Pacific Railroad.

"I will be one of ten or eight," said Huntington, "to assume all the expense of making a thorough survey, if Hopkins is willing."

Hopkins was willing, and so were the others; and, after canvassing the subject thoroughly, it was decided to organize the Central Pacific Railroad Company. Leland Stanford was made president, C. P. Huntington vice-president, and Mark Hopkins secretary and treasurer. These are the officers to-day, except that Hopkins is dead. It is the only railroad in this country that has not slipped out of the hands of its originators in a very short time. But the boy who expected to do something larger and better than piling wood a year hence, still keeps a firm grip on this world-renowned railway, whose bonds are as good in Europe now as those of the United States government.

"We will pay as we go," said Huntington. "Never run a dollar in debt. If we can't pay a hundred workmen, we will pay fifty; if we can't pay fifty, we will pay ten; if we can't pay ten, we will pay one. We will employ no more men than we can pay." In that way the road was built.

When the time came for depot headquarters at Sacramento, the engineer was asked to draft a plan. When his plan was presented to Huntington, the latter examined it carefully, and inquired: —

"The cost?"

"About twelve thousand dollars."

"Very nice plan," Huntington added dryly; "but our business is rather too small to warrant such an expense now. I think such a building as this will answer our purpose for the present"; and, suiting his action to the word, he drew a plan upon the store-door with chalk; and his plan was adopted. It was a board building, put up in a single day, at an expense of one hundred and fifty dollars.[1]

[1] See page 269.

The times that try men's "souls" came pretty often to Huntington and his associates. He obtained government aid and State aid, it is true, but there were so many conditions interposed that trials multiplied. On returning from New York, at one time, he found the treasury exhausted; whereupon he called together his associates, and the immortal five agreed to keep *eight hundred* men at work for one year at their own individual expense!

CHARLES CROCKER.

Charles Crocker was born in the city of Troy, N.Y., Sept. 16, 1822. All the schooling he ever enjoyed was in that city before he was twelve years of age. His parents were in straitened circumstances, so that, at about the age of twelve, Charles began the life of a newsboy, and earned his own living at that business.

In 1836, when Charles was fourteen years of age, his father removed to Northern Indiana, and settled upon government land. Northern Indiana was a wilderness at that time, and the home of Charles was a log cabin. "Clearing the land" was the first work to be done preparatory to farming, and it was new business for Charles; but he engaged in it with that spirit and enterprise which have characterized him ever since.

His mother died in September, 1839, when he was seventeen years of age, leaving his home desolate indeed. The following winter a disagreement arose between him and his father, and the latter resorted to the extreme measure of turning him out of doors, and bidding him leave. It was in February, and two feet of snow covered the ground, when he turned his back upon his father's cabin to face the world. His father meant it for severe punishment, but it turned out to be his first step on the road to fortune. He was now just eighteen years of age, and his worldly possessions, on leaving home, consisted of a cotton shirt, a linen "dickey," a pair of socks, and a cotton handkerchief in which the other articles were wrapped. He had not one cent of money with which to begin life for himself, and no prospect of having any until he earned it.

His way was through the wilderness; and after the first night had set in he reached a farmhouse, the proprietor of which was in the barnyard with a lantern, feeding his cattle. Charles approached him and inquired:—

"Are you in want of help?"

"Well," replied the farmer, "that is a want I usually have. You want a place?"

"Yes, sir; that is what I am looking for."

"You are able-bodied," continued the farmer, "and I should think might be a good worker. I will hire you on trial for a month."

"Agreed," responded Charles, rejoiced to find a situation so readily.

At the end of the month, Charles inquired of his employer if he wanted him any longer.

"Certainly I do," answered the farmer.

"At what wages?" continued Charles.

"For as much as any man in the country gets," was the farmer's hearty response.

This was a fine compliment to Charles, and speaks well both for the quantity and quality of his work. He continued to work for the farmer until the following September, when, for sufficient reasons, he went to work for John J. Deming in a saw-mill at Mishawaka, Ind.

While working in the saw-mill, he realized that he needed a better education; so the next winter he quit work and attended school, paying his board to the pastor of the Presbyterian Church by doing chores. In the spring he went to work for Alphonso Wilson in his iron foundry. Here his services were so efficient that Mr. Wilson soon learned to trust him with any part of his business. He was so apt to acquire methods of doing business, the nature and quality of materials, and whatever pertained to work in the foundry, that his services became indispensable to his employer, and he continued to serve him four or five years. Then he prospected for iron ore in Marshall County, and was successful. He discovered a rich mine, and Mr. Wilson furnished capital to run it. The agreement between them made Charles the sole manager, on a salary of five hundred dollars, and a quarter share of the entire interest, Mr. Wilson erecting a forge there, and paying for half the land. The firm was known as Charles Crocker & Co. Thus, in six years from the time his father turned him out of doors, he was the proprietor of a prosperous business, and at the same time commanded the confidence of the public. He continued in this business until 1848, when the gold excitement of California led him to sell out to Mr. Wilson. Before the papers were passed, however, the forge was burned to the ground. This calamity did not dishearten, but only delayed him.

He returned to the scene of the disaster, cleared away the ruins, and built another forge thereon. Then he made another sale to Mr. Wilson, accepting two thousand dollars in cash for his part, and at once started with a company of young men he organized, one of whom was his brother, for California. The fire and subsequent labors had delayed him a full year, but on July 10, 1850, he reached Sacramento. They repaired immediately to the mines where they toiled without success for several months. Then Charles decided to engage in the store business at the mines, but soon removed to Sacramento, where, with his brother as partner, he entered upon a career that "led on to fortune."

In October, 1852, he returned to Indiana, and married the daughter of John J. Deming, in whose saw-mill he worked so long. One week after his marriage, he received a message announcing the burning of his store in Sacramento, and the total loss of all his goods, the value of which was eighty thousand dollars. This calamity left him even poorer than he was when he went to California; but his pluck and perseverance were left. He started immediately for Sacramento with his wife, resolved to start business anew on arriving there. His purpose was promptly executed, and just as he was on the high tide of prosperity, a few months thereafter, the city was burned, and then it was overflowed with water to the depth of four or five feet. But his pluck was neither burned nor drowned, and he started out again, charged with energy, tact, and hope, and in less than two years he possessed other thousands.

In 1855 he was a member of the Common Council of Sacramento, and introduced several important and necessary reforms. In 1860 he represented the city in the State Legislature; and it was at this time that he united with C. P. Huntington, Leland Stanford, and Mark Hopkins in the Central Pacific Railroad enterprise. Having spoken of this in the sketch of Mr. Huntington's life, we need not repeat it here. It is sufficient to say that, after the action of Congress organizing the Union Pacific Railroad, Mr. Crocker took the first eighteen miles of the Central Pacific to build; and he built it, of course. He not only built that, but he also built other portions of the road which other contractors had failed to complete. He organized the "Contract and Finance Committee," and was elected president of the same; and under his superintendence, the Central Pacific Railroad was pushed through to Ogden. He built, also, nearly all the local railroads tributary to the Central Pacific within the limits of California.

It is generally conceded that the Central Pacific Railroad was

the most gigantic railroad operation in the whole world, when the tremendous difficulties to be surmounted are considered; and it has been the grandest success of all. The action of Congress to assist the road was hampered by the provision that fifty miles should be built and equipped with rolling stock, before Congressional aid could be available. The enterprise would have succumbed at this point, but for the courage and liberality of Crocker and his three associates named; for it required *twenty million dollars* to construct the first hundred miles. Of this amount the government subsidy only supplied five millions, and Crocker and his associates were obliged to supply the remaining *fifteen millions*. Add to this the tremendous engineering obstacles to the construction of the road, and the reader can judge of the spirit, tact, and determination equal to the task.

In 1871 Mr. Crocker was elected president of the Southern Pacific Railroad, the capital of which was increased, under his administration, in 1884, to *one hundred millions*, and was reorganized with the control of four thousand six hundred and ninety-eight miles of railroad and four thousand two hundred and five miles of steamship lines, almost nine thousand miles in all. The lease of the Central Pacific was included in this vast interest. In addition, there are the Southern Pacific Companies of California, Arizona, and New Mexico, Morgan's Louisiana and Texas Railroad and Steamship Company, Galveston Harbor and San Antonio Railway, Texas and New Orleans Railroad Company, Louisiana Western Railroad Company, and the Mexican International Railroad Company; all these are included in the colossal Southern Pacific Company, of which Charles Crocker is the animating spirit. The gross earnings of this company in eight months of 1885, was $19,645,892.91, and, after paying all expenses, interest, and rentals, the net surplus was $1,509,753,64.

This brief and imperfect sketch gives only a glimpse of a very remarkable life, the marvellous part of which was crowded into thirty years. The youth who went out into the world without one cent in his pocket in 1840, was a millionnaire in 1870, in spite of fire and flood; and, in 1887, he presented to his daughter, on her wedding day, a costly residence in New York City, and a check for *one million dollars*. He died in 1888.

LELAND STANFORD.

Ex-Governor Leland Stanford, of California, was born in the town of Watervliet, Albany County, N.Y., March 9, 1824. His father was a farmer of an enterprising turn, sound integrity, and of unblemished character. His mother was an intelligent and noble woman, — a very suitable helpmeet for her industrious and aspiring husband. Their family consisted of seven sons and one daughter. Leland was the fourth son, fond of books and reading, full of spirit and hope, and more of a scholar than either of his brothers. Schools were of inferior grade compared with schools of to-day; but such as they were he enjoyed and got more out of them than most of the boys in the district. He loved his books better than farming, although he followed the latter with considerable enterprise. He had his daily tasks to perform on the farm as soon as he was old enough to work, and these he accomplished with unusual tact and despatch. Little grass grew under his feet, bright and lively as he was; and he seemed born to activity and success.

Until twenty years of age, Leland's time was divided between the school and farm, and then he commenced the study of law. In 1845, he entered the law office of Wheaton, Doolittle & Hadley, in Albany, N.Y. His heart was set on becoming a lawyer, so that he improved his opportunities as one who realized that he had no time to waste on trifles. On completing his studies, the great West opened its arms to him, as he thought. The profession was crowded in New York, but there was ample room in the West. He put out his shingle first in his native state; but the chance for a young man was comparatively small, and he soon resolved to adopt Horace Greeley's advice, — "Go West, young man!" He packed up his wardrobe, books, and what not, and off he started for Port Washington, Wis. This was in 1849, when Port Washington was on the frontier. Wisconsin was a part of the "far West" at that time, — about as distant as young men aspired to go, except those who responded to the cry of gold! gold! on the Pacific Coast. Only one year before, gold was discovered at Sutter's Mill in California, and there was great excitement in the land over the discovery. But Leland Stanford was not carried away by the gold mania. He wanted to practise law; and a new, thriving, growing town in Wisconsin was a better place for that business than California. He was well pleased with his new home, and found no difficulty in working up a fair business. He was popular, and honored by all who knew

him. The girls especially regarded him as about the most fascinating and promising young man they ever met; and one of the number, Miss Jane Lathrop, decided to unite her fortunes with his, and in 1850 they were married. A good choice, a good start, and a noble purpose, combined to make him successful.

But the gold-find in California was calling tens of thousands of people to that El Dorado, and new towns and cities were springing up like magic. He saw a new and brighter opening there, and resolved at once to make the most of his opportunity. Some of his best friends were going thither, too, and here was another inducement, to keep them company. He settled up his business, packed his effects, and started for Sacramento, where he landed July 12, 1852. Wasting no time in deciding whether he should practise law or delve for gold, he left Sacramento for the mines at Michigan Bluff, on the American River, Placer County. It proved that he was exceedingly fortunate in selecting a place for mining, for he stepped right into success with scarcely an introduction. Not only wealth, but popularity, flowed in upon him, to his surprise. His ability, tact, enterprise, and real worth, won him friends on every hand. His public spirit, as well as his fearless advocacy of Republican principles, pushed him to the front. In 1859 the Republican party nominated him for State Treasurer, but the Democratic candidate defeated him. The Democratic party had never been beaten at that time; and it was reserved for Leland Stanford to accomplish this feat in 1861, when the Republicans nominated him for governor, and he was elected by a plurality of twenty-three thousand votes. He became the most popular governor that California had ever had, and was respected and honored by all classes.

About this time he became interested in the Central Pacific Railroad, as we have seen. In Feb. 22 of that year,—Washington's birthday,—he threw the first shovelful of dirt in the construction of that road; and on May 10, 1869, he drove the last spike at Promontory Point, Utah, where the Central and Union Pacific united their destinies in a grand transcontinental line.

Since that time Mr. Stanford has been prominent in the history of our country, not only as one of its wealthiest, but one of its most remarkable men. His wealth is counted by tens of millions, and both in his State and nation he is a man of influence and power. He has not only served his State, but his nation, also, in Congress. In every position, he has proved himself efficient and true, worthy of the confidence of his countrymen. He has recently given to the

State of California *twenty million dollars* to establish and support a university at Palo Alto. The purpose of the university is stated in his own words, as follows: —

"I intend that the Stanford University shall not only give one a classical education, but that under its roof one may learn telegraphy, type-setting, type-writing, journalism, book-keeping, farming, civil engineering, etc. For a number of years prior to its inception, young men, graduates of Harvard, Yale, and other Eastern colleges, used to call upon me, bearing letters of introduction, and asking me to find employment for them. I would learn on examination that, while their knowledge of Greek and Latin, logic and metaphysics, might be thorough, they were actually helpless so far as practical knowledge went. They were willing to learn, it is true; but the world is full of unskilled labor, and so I was forced to put them on the railroad as conductors, brakemen, and firemen, in order that they might become self-supporting. I then conceived the idea of a university from which young men could graduate fully equipped for the battle of life, in whatever direction the taste might run."

Including his estate at Palo Alto, his munificent gift will amount to *twenty-five million dollars*. The corner-stone of the university was laid on May 14, 1887, which was the nineteenth birthday of Mr. Stanford's son; and the institution has just been opened (October, 1891) with several hundred pupils of both sexes in attendance.

SIDNEY DILLON.

Sidney Dillon was president of the Union Pacific Railroad several years, a representative man, whose life has been identified with large public works. He was born in Northampton, Montgomery County, N.Y., May 7, 1812, seventy-five years ago. His father was a farmer in good circumstances, and of decided influence in his town. His grandfather was ditto, a Christian man of unblemished character, as patriotic as he was industrious, for he was a brave soldier of the American revolution. The mother and grandmother were women of intelligence and great worth, who left their impress upon their posterity.

Sidney took his turn on the farm, and proved himself competent even in his boyhood. His father and mother set a high value upon the education which even the poor schools of that day afforded, and provided him with every opportunity possible. But out of school he was expected to work; nor was he at all disinclined to labor on the

farm; for he had "a heart for any work." His ambition, however, looked beyond the farm. His enterprising spirit soared higher; and when he was not more than fifteen or sixteen years of age he became an errand boy on the Mohawk and Hudson Railroad. This was the first railroad constructed in the State of New York. It run from Albany to Schenectady. Sidney was greatly pleased with his new business, and the business was pleased with him. His pay was small; but it was a good school for him; and he so regarded it. His sharp observation enabled him to learn many things outside of his daily routine of duties. This quality developed him rapidly, so that he was fitted for a higher position while he served as errand boy. Hence we find him within two or three years in a more responsible position on the Rensselaer and Saratoga Railroad. Here the same attention to business, and the same efficiency in doing it, characterized him. In consequence, the attention of a railroad contractor was directed to him, and he hired him to oversee a section of the Boston and Providence Railroad, which he was to build. He proved himself to be so efficient here that he was subsequently employed to oversee the execution of contracts upon other railroads.

In 1838 he himself became a contractor, undertaking a job which lasted nearly two years. He did well for himself in this, and well for the company. From that time he was not under the necessity of seeking contracts, for contracts sought him. He built two miles of the Troy and Schenectady Railroad, twenty-six miles of the Hartford and Springfield, six miles of the Cheshire, and ten miles of the Vermont and Massachusetts. And here is only a part of his railroad work; for he assisted the construction of the Rutland and Burlington; Central of New Jersey; the Morris Canal; the Boston and New York Central; the Philadelphia and Erie; the Erie and Cleveland; the Morris and Essex; the Boston, Hartford, and Erie; the Iowa; the New Orleans, Mobile, and Chattanooga; the Canada Southern; the Union Pacific; and how many more he only knows. What he had accomplished only sharpened his appetite for greater achievements; for then he contracted for the "Fourth Avenue Improvement," New York, which involved $7,000,000. This was a work of such magnitude that few contractors could undertake it. But it was easier for him than a game of chess. It was a great job; but he was greater than the job. The work was done, and well done, under his faithful administration. The foregoing experience had just fitted him to be president of the Union Pacific Railroad, which office he filled as well as he had all inferior ones. It is claimed that he has

been engaged in over forty of the great public works of our country, and that his contracts have amounted to *one hundred million dollars.*

DAVID H. MOFFAT.

David H. Moffat, of Denver, Colorado, was born at Washingtonville, Orange County, N.Y., in the year 1839. When fifteen years old, he went to New York, and commenced his business career as a messenger boy in the New York Exchange Bank. After working in that capacity for one year, he went West, and took a position as clerk in the banking house of A. J. Stevens & Co., of Des Moines, Iowa. Remaining with them a short time, he was offered a better place with the Bank of Nebraska, at Omaha, which he accepted, and was finally appointed cashier. After filling that office for four years, with credit to himself and profit to the bank, he wound up the business, paying all indebtedness in full and a handsome dividend to the stockholders. At that time (1860) the Pike's Peak fever was raging, and Mr. Moffat bought some mules and a wagon, joined a company organized in Omaha, and went with them across the plains to seek his fortune in the new El Dorado. This was before the days of railroads, and he experienced all the hardships and suffering attending a journey, where the road was infested with hostile Indians, and lined with the graves of their victims and men who had succumbed to exposure and starvation.

Arriving in Denver, when it consisted solely of a camp of gold prospectors located on the banks of the Platte, in company with C. C. Woolworth, of New York, he started a book and stationery store, which he ran for six years, and established a large and profitable business. He retired from this in 1866, to take the position of cashier of the First National Bank of Denver. In 1881 he was elected president, and has been closely identified with that institution up to the present time, and his administrative ability has made it the strongest and most conservative national bank between Chicago and San Francisco. It has a capital and surplus of five hundred thousand dollars, and three million dollars of deposits.

He became largely interested in mining in Leadville, in 1878, by purchasing an interest in the famous "Little Pittsburg," with the late Hon. J. B. Chaffee. The next year they bought H. A. W. Tabor's interest in said mine,—an enterprise that proved financially a great success.

But Mr. Moffat's forte lies in another direction — railroading. At the present time he holds the presidency of the Denver and Rio Grande Railroad, to which office he was elected in 1884. He has been prominently connected with all the leading railroad enterprises of Colorado. In 1869, together with Governor Evans, he built the Denver Pacific from Cheyenne to Denver, without which Denver would have lost its supremacy, and its business would have centred at Cheyenne. He, with others, organized the syndicate of Denver capitalists, who built the Denver and South Park Railroad to Leadville, which at one time was the best paying railroad in the world. He also furnished a large amount of capital to build the Denver and New Orleans Railroad, which will ultimately give Denver a through line to New Orleans. While Mr. Moffat has amassed a large fortune entirely through his own efforts, having started in life a poor boy without a dollar, he has always extended a helping hand to others. The present unexampled growth and prosperity of Denver and Colorado is largely owing to his public spirit and enterprise.

In spite of his wonderful business career, which would have worn out many men, he is comparatively a young man, being but fifty-three years of age, — an early age for the many prominent positions he has held in the leading railroad and financial institutions of the West. Should he live twenty years longer, and retain the same business capacity and energy of his past life, his fortune and influence will not be excelled by any of the railroad magnates of the country.

IV. MARVELS OF MINING.

THE discovery of gold in the New West, in 1848, came about in this way. John A. Sutter, a Swede, drifted to this country, and settled in California in 1839. He was a very enterprising, industrious, and successful pioneer; and, in 1848, he was the owner of a flour mill, saw-mill, tannery, and a large tract of land on which his many thousand cattle, horses, and sheep grazed.

In his employ was one James W. Marshall, in whose imagination floated visions of gold. He believed that there was a plenty of it in that country waiting to be discovered. He was a mechanic, and built Sutter's saw-mill, which commenced running in January, 1848. On the second day of February Marshall shut the water off, when he discovered particles of shining dust in the race-way. "Gold! gold!" he said within himself under great excitement, and at once instituted an examination, the result of which was an ounce of gold picked up in the race-way and dug from the crevices of rocks. He was almost beside himself with excitement. Mounting a horse, he dashed away to report to Captain Sutter, who was at his home-fort, forty miles distant. It was late in the evening when he reached the fort, and rain was descending in torrents.

Leaping from his horse, he said to Captain Sutter, hurriedly and excitedly, —

"Captain, I want to see you alone."

Sutter conducted him into a vacant apartment, and closed the door.

"Are you sure no one will intrude? Lock the door," continued Marshall, so excited as to awaken Sutter's suspicion that he was crazy.

Sutter locked the door, and assured his friend that no one could hear or see them.

Stepping up to the table, Marshall poured from a pouch his ounce of gold.

"Gold! gold! That is gold!" he exclaimed, scarcely realizing whether he was in the flesh or out.

"Where did you get that?" inquired Sutter.

Marshall rehearsed the events of the day, and his discovery of gold in the race-way, enjoining profound secrecy upon the captain.

"But you do not know that it is gold," suggested Sutter. "I have my doubts about it."

After some discussion, however, Captain Sutter settled the matter by the application of aqua fortis. The test showed it to be gold.

Now Marshall's excitement reached its climax, and in vain did Captain Sutter entreat him to stop over night. He must return immediately, and insisted that Sutter should accompany him. The latter peremptorily declined to go with him in the driving rain, but promised to go in the morning. Marshall started back, and Sutter went to bed, though not to sleep.

Early in the morning, the storm having passed away, Captain Sutter hurried away to the mill-race. When within ten miles of it, he met Marshall on foot.

"That you, Marshall?" exclaimed Sutter. "What are you here for?"

"I was so impatient to see you that I walked this distance to meet you," — a reply which showed how great was the excitement under which he was laboring.

On arriving at the mill-race, they found all the men engaged in gathering gold. Realizing that the gold-find might create so much excitement as to compel the stoppage of his flour and saw mills and tannery, as well as all labor upon his immense ranch, he called the men together, and exacted a promise of secrecy for six weeks, during which time they should faithfully attend to their labors in the mills, tannery, and on the farm. But such a secret could not be kept. In a few days the news was on the wings of the wind, and the rush to this Eldorado was without a parallel. Sutter's men forsook his mills and ranch to search for gold; and all his interests were left to neglect and ruin. Gold-seekers struck anywhere upon his ranch they pleased, and it was almost literally dug up. Without leave or license, they appropriated any part of his wide domain to their own use. They even stole, killed, and ate his flocks and herds, helped themselves to his large crops of wheat, corn, and potatoes, spoiled his fur trade with the Indians, and his hide and leather traffic with the East, and left everything a wreck. Sutter was forced to resort to the law to re-establish his claims, in which litigation he spent his last dollar, and finally, after some years of hard struggle with poverty, he died.

Marshall was no more fortunate. He gathered some gold, but it slipped out of his hands, so that, in the end, he derived no pecuniary profit from his valuable discovery. Hence it has been said, that the discovery of gold on the Pacific Slope ruined both the discoverer and the owner of the land on which it was found.

General Sutter, whose name the mill bears, settled here over fifty years ago, under a grant from the Russian government. That grant conveyed to him large tracts of land, including the site of Sacramento, of which Sutter's Mill, or HOCH FARM, as it was called, was a part. Of course, he was really a rich man; but swindlers made him a poor one, and he died a pauper. Mr. Charles Nordhoff visited the place in 1873, and speaks thus of it: "You may still see his grove of fig-trees, under whose shade the country people now hold their picnics; his orchards, which still bear fruit; and his house, which is now a country tavern. Of all his many leagues of land, the old man has but a few acres left; and of the thousands who now own and inhabit what once was his, not a dozen would recognize him, and many scarcely know his name. His riches melted away as did those of the great Spanish proprietors; and he who only a quarter of a century ago owned a territory larger than some of the States, and counted his cattle by the thousands, — if, indeed, he ever counted them, — who lived in a fort, like a European noble of the feudal times, had an army of Indians at his command, and occasionally made war upon the predatory tribes who were his neighbors, now lives upon a small annuity granted by the State of California."

Five thousand men were at work in the mines before the close of the year 1848, and the product of their labor was *five million dollars*, an average of *one thousand dollars* to a man. There were about two thousand men living in San Francisco in January, 1848, all but five of whom left for the gold-field.

No doubt there was much exaggeration in regard to the richness of the mines; at any rate, many adventurers risked life itself to reach the land of gold, expecting to fill their pockets daily with the precious metal. And yet, the real facts in the case were marvellous. Gold was found in so large quantities, that the five thousand seekers in '48 believed there was enough for every man who might come. Two ounces per day was but an ordinary yield for each man, and many did much better than that. As the value of gold was twelve dollars per ounce in cash and sixteen dollars in trade, their hard labor was very remunerative. Colonel Mason, who made an examination of the mines for the government, confirmed, in his official

SUTTER'S MILL.

report, their reputation for richness and magnitude. He said that the leading store at Sutter's Fort in nine weeks received thirty-six thousand dollars in gold-dust, in exchange for goods; and that two men took out of a small ravine seventeen thousand dollars in seven days. He relates that seven miners hired fifty Indians to work for them seven weeks. At the end of that time, they had two hundred and seventy-three pounds of pure gold, the cash value of which was nearly forty thousand dollars. Some men, on some days, made a hundred dollars each, and even more. A miner pulled up a bush one day, and shook the earth from its roots into his pan, as a farmer pulls and shakes a hill of potatoes, and the yield of gold from that bush was nearly fifty dollars. In 1850, a nugget of gold was found in Nevada County, valued at three hundred and twelve dollars. In Columbia District, the same year, several nuggets of even greater value were picked up, one of them weighing twenty-three pounds. It was not unusual for a piece of ground ten feet square to yield ten thousand dollars from the surface-dirt. Many facts of this kind prove that gold was plentiful, however much exaggeration there was connected with its discovery. The subsequent history of mining on the Pacific Coast proves, also, that the facts are marvellous. Since the discovery of gold there in 1848 the product of the mines of California to the present time exceeds $1,300,000,000! Marshall's ounce of gold-dust assured the speedy settlement and growth of the New West. "Money makes the mare go," is an old maxim that has been wonderfully illustrated in the progress of Christian civilization in the Rocky Mountain region.

OFF FOR THE MINES.

There were scarcely two thousand Americans in California in February, 1848; in December there were *six thousand;* in July, 1849, *fifteen thousand;* and in December of that year, *fifty-three thousand.* It was claimed that the rush of men to California, in five years after

the discovery of gold, was so immense as to remove the centre of our country's population eighty-one miles west. Then the inhabitants of California numbered *three hundred thousand*, and nearly *two hundred and seventy million dollars* had been extracted from the mines. The author of that valuable work, "Mining Camps," says: "The summer of 1849 saw no less than five hundred and forty-nine sea-going vessels in the port of San Francisco. In the month of August, four hundred large ships were idly swinging at anchor, destitute of crews; for their sailors had deserted, swam ashore, escaped to the gold-fields. Thirty-five thousand men came by sea, and forty-two thousand by land, during the year. Australia, the Asian coasts, Africa, and South America contributed to the motley host that thronged the roads to the placers." Prices were fabulous: a shirt, $25; a comb, $6; barrel of mess pork, $220; dozen sardines, $35; a hundred pounds of flour, $75; a candle, $3; tin pan, $9; shovel, $10; pick, $15.

Ten years later, the discovery of gold in what is now Colorado created another "unparalleled excitement," as we have already seen. As Colorado was more accessible than California, the rush of prospectors was much larger. They poured into the gold-fields by tens of thousands. Many even left the mines of California for richer ones, as they supposed, in Colorado. No amount of hardship and suffering could deter the tide of immigration. Many of the gold seekers were the most intelligent and substantial men of the Anglo-Saxon race from the East, West, and South. Unwittingly they came to lay the foundation of an empire. They were the modern Argonauts, who sought only "the golden fleece," but developed the richest, fairest, grandest country on earth.

Beginning at Cherry Creek, near the site of Denver, this army of prospectors scoured the "Plains" and penetrated the Rocky Mountains, searching for gold. Clear Creek Cañon, Boulder, California Gulch, and a large number of other localities "opened rich," augmenting the excitement with the increase of the gold-product. Then followed the discovery of silver, which was as unexpected as it was fortunate, opening new fields of research, and bringing other thousands of enthusiastic toilers into the Territory.

At the same time, the prospector was abroad in Arizona, Nevada, Utah, New Mexico, Montana, Idaho, and, indeed, throughout the whole country between the Missouri River and the Pacific Ocean; and the news of rich mines in all these localities spread wildly over the land. Untold millions of precious stones and metals were treas-

ured in the Rocky Mountain region, and the key was found with which to open the vaults. Throughout the vast territory which the United States government purchased of France and Mexico for about *thirty million dollars* (two cents per acre) was made the disclosure of unparalleled resources in gold and silver. This was especially true of Colorado, from whose mines alone have been taken eight times as many dollars as the government paid to France and Mexico for their mammoth claims in what we now call the New West. Since that day of small beginnings in the gold harvest on Cherry Creek, the mines of the Centennial State have yielded about *three hundred million dollars.* Colorado has mines which have yielded fabulous amounts in a short time. In eighteen months, prior to 1880, the Little Pittsburg yielded ($3,800,000) *three million eight hundred thousand dollars;* the Little Chief, in the same period ($2,056,292) *two million fifty-six thousand two hundred ninety-two dollars;* the Chrysolite, in fifteen months ($2,100,000) *two million one hundred thousand dollars;* the Gregory, *seven millions* in sixteen years; and the Bobtail, *five millions* in fifteen years.

In, 1883 the bullion product of Colorado was ($26,376,562) *twenty-six million three hundred seventy-six thousand five hundred and sixty-two dollars*, nearly the amount which our government paid to France and Mexico for the immense territory spoken of. In 1884, the amount was somewhat diminished, but amounted to ($20,233,749) *twenty million two hundred thirty-three thousand seven hundred forty-nine dollars.* In 1885, its bullion product was ($22,500,000) *twenty-two million five hundred thousand dollars.* Colorado took the lead of all the States and Territories in bullion product in 1880, California taking the second place, and Nevada the third place. Colorado has stood at the head of the column ever since.

In eight years (from 1859 to 1867) the Comstock lode in Nevada yielded the enormous sum of ($66,000,000) *sixty-six million dollars.* It was thought in 1867 that this could not be beat; and yet this lode largely advanced its production in the next twelve years. For in twenty years from 1859, its production reached the startling figures ($385,000,000) *three hundred eighty-five million dollars*, — an annual average product of over ($19,000,000) *nineteen million dollars.*

With this production of vast wealth, it is not strange that the first "Industrial and Mining Exposition" ever known in the world should be opened in the New West, where twenty-five years before there spread out the most barren waste of the whole region. Had a prophet of a generation ago foretold that the first great mining exposition in

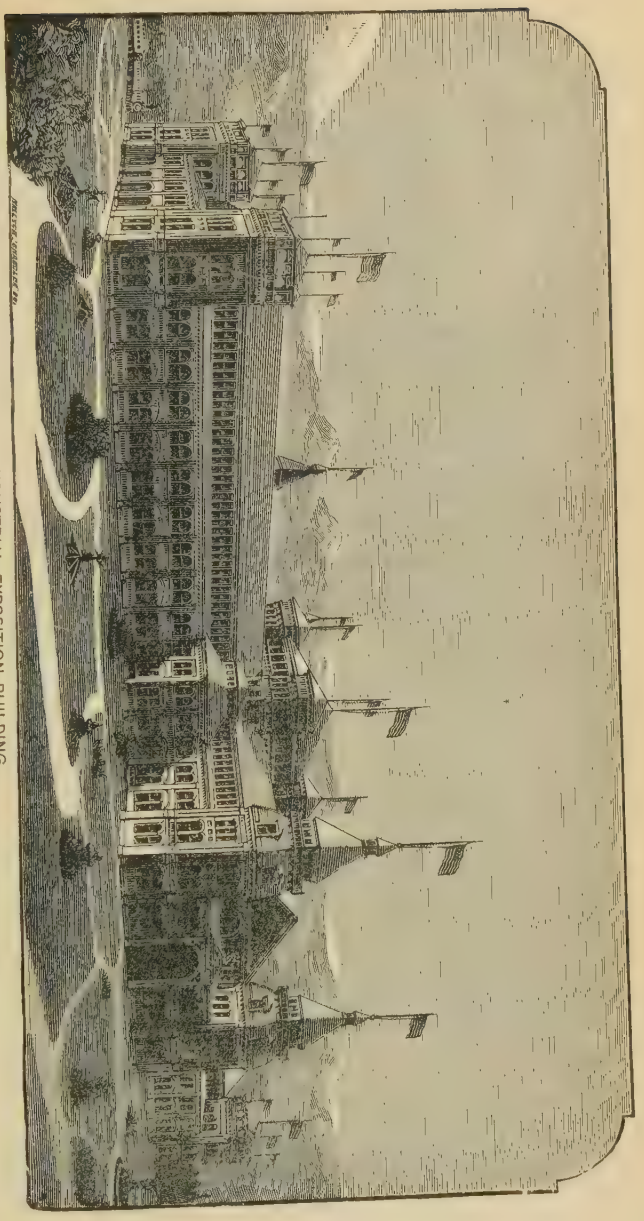
the history of nations would be opened on the desert lying between the Missouri River and the Rocky Mountains, his prophecy would have been regarded too ludicrous to provoke even a smile. And yet we are able to furnish an account of just that occurrence, accompanied with a good illustration of the costly and beautiful Exposition Building, which rose like magic, in 1882, upon a location so recently abandoned to the support of the buffalo and savage, and which stands to-day a monument of the industry and wealth of the Anglo-Saxon race under the shadow of the Rocky Mountains.

The Industrial Exposition Building, a view of which is shown on the following page, is 500 feet in length by 310 in extreme width. The amount of space available for exhibition purposes is 82,230 square feet on the ground floor, and 33,850 in the gallery, amounting in all to about three acres. The construction of the building required 3,250,000 bricks, 1,250,000 feet of lumber, 700 boxes of window glass, 50,000 pounds of nails, and over three acres of tin roofing. Power is furnished for machinery by a 250-horse-power Corliss engine, the boilers of which are located in a separate building, 50 × 50 feet in size. Besides the engine-house, there are several large annexes for agricultural implements, machinery, etc. Steam and water are carried to all parts of the building, and it is lighted at night by the Weston electric light. It is truly an artistic structure, and is located on six acres of ground, two miles or more from City Hall, which the Association purchased of the commissioners of Arapahoe County for $25,000. The cost of the building was ($150,000) *one hundred fifty thousand dollars.*

The first exposition was opened Aug. 1, and closed Oct. 1, 1882. Each year since an exposition has been opened at the same season of the year, and continued about the same length of time, each one eclipsing its predecessor in the magnitude of its exhibit. While mining products were made a specialty, all the industries of Colorado and the New West were largely represented. At the first exposition, 4,551 mines were represented, from which 678 tons of ore were shown, the estimated value of which was $718,850. The exhibition was a surprise even to those well acquainted with mining. Hon. W. D. Kelley delivered the address at the opening of the first exposition, and he began by saying: —

"The splendors of Palmyra and the desert pale before a recital of the brief history of Colorado. Ten years ago, I spent some weeks in traversing your beautiful State, and became familiar with everything of note in Denver, its metropolis; and, as yesterday morning I

looked upon the city again, I felt that I could not safely trust my own senses. I wondered whether I was not under the dominion of magi, and that fairies and genii were playing tricks with my vision. History may be challenged, and challenged in vain, for a parallel to the progress made by this city in its brief period, in wealth, in arts, in all the elements of modern and advancing civilization.



On Line of U. P. Railroad. INDUSTRIAL EXPOSITION BUILDING.

"Standing here on the western borders of what was called but a few years ago the desert plain, and in the shadow of the Rocky Mountains, with an elevation of more than five thousand feet above the level of the sea, we mark in the opening of this exhibition the entrance of a new era in history, more brilliant than any of its predecessors, and more beneficent, inas-

much as it will open the blessings of civilization to portions of the people who have hitherto failed to receive them."

First of all, in the mining business, appears the "prospector." He is one who searches for mines. Although the discovery of gold in California, in 1848, and in Colorado, ten years later, was accidental, as miners say, yet these discoveries created a new class of workers; viz., prospectors. Mines do not "lie around loose," to be stumbled upon by ignorant and unenterprising men; they are

PROSPECTORS.

found generally by the most painstaking and wearisome labors. To-day some mines are found where they were searched for in vain twenty years ago. Investigation, experience, and science have contributed a fund of knowledge to make the researches of the prospector easier and surer.

The prospector may be a native or foreigner; an ignorant adventurer or a graduate of Harvard or Yale; a man who expects to make a "lucky strike," or one who knows that industry and perseverance alone will hew his way to success. The great majority of

the former class have found their level in poverty or the grave, leaving the field of exploration open for the more intelligent and enterprising to occupy.

In the autumn of 1883, we met a very interesting young man of thirty years in Chalk Creek, Colorado. He had been a successful schoolmaster and prospector, but for several months had been working his "claim." The following was the story of his success: —

He was a teacher for several years in a large city east of the Mississippi. There were two other schoolmasters in the same city, about his age, both of them very efficient in their profession. Each of them had laid by three or four thousand dollars, when one of the number, who had read and studied much about mining, proposed a prospecting tour in Colorado during the approaching summer vacation. The result was a decision to abandon school-keeping for mining at the expiration of that school-year.

Having decided to follow mining as their life-business, they started out with their "gripsacks," prepared to walk any distance that was necessary, or to ride in car or stage, or on mule or buckboard, as the case might be. They must find a mine. They expected to find one. They did find one.

After prospecting for several months in the Rocky Mountains, without meeting with the success which their ambition coveted, they heard of a mine up in Chalk Creek that had been abandoned by the owners for want of money to work it. Thither they repaired, instituted a thorough examination, and became satisfied that the parties abandoned the enterprise when they were on the eve of success. They bought the mine for a song, and within a few weeks were extracting gold in sufficient quantities to assure their fortunes. They proved themselves as efficient in the mining industry as they did in school-keeping. Their intelligence, tact, and persistent efforts run the mine as easily as they did the school.

In a town on the Pacific slope, a minister rehearsed the following incident to the writer. A few Sabbaths before, a stranger came into his congregation, wearing long unkempt hair and a miner's suit of canvas. His external appearance was that of a miner, but his bearing was that of a literary gentleman. He paid the closest attention to the sermon from beginning to end, thereby adding to the preacher's interest and curiosity. The latter became intensely interested in his new hearer; and, at the close of the preaching service, he was delighted to find that the stranger remained to join the Sabbath school. "Now," said the minister to himself, "I will find out who

he is and where he came from." He thought he must be a literary gentleman.

The school was all embraced in one class, taught by the pastor; and, in the lesson of that day, there arose a discussion upon the change of the Jewish to the Christian Sabbath. Several different opinions were expressed, when the pastor, thinking that his favorable moment had arrived, addressed the stranger: —

"Friend, we are glad to see you, and would be most happy to hear from you. Have you any thoughts to express upon this subject?"

The pastor had given his interpretation of a certain passage of Scripture, and he was somewhat taken aback by the response of his new pupil.

"I do not think that your interpretation of the passage is supported by the original Greek."

"Do you understand the Greek language?" inquired the pastor.

The stranger thrust his hand down into the big pocket of his miner's suit, pulled out a Greek Testament, and proceeded to read the passage in Greek, and then translated it, with such comments as appeared to him pertinent.

After the school was dismissed, the pastor had an interview with the stranger, and found that he was a graduate of Yale College, but was then a prospector in the mountains six miles distant.

At the present time, it is not necessary for ignorance and inexperience to try their "luck" in hunting mines; for a quarter of a century has produced a supply of men who understand the business, — geologists, mineralogists, learned professors, practical explorers, who repudiate "luck and chance" in this business, as really as the stock-raiser or manufacturer do in theirs. A "School of Mines" at Golden, Col., educates young men, or older men, for every part of this important service. A prospector must know how to prospect, as the chemist must know how to analyze, or the mechanic how to turn out his handiwork.

There is but one sentiment among the initiated respecting the value and necessity of knowledge, observation, experience, and tact, to the prospector. Alexander Del Mar, M.E., of San Francisco, wrote, a few years since, as follows: —

"Mining does not consist of a knowledge of geology, nor fossilism, nor petrology, nor chemistry, nor metallurgy, nor microscopy, nor geodesy, nor surveying, nor mechanics, nor hydraulics, nor of how best to handle a rocker, a tom, a pick, a sledge, or a drill. It con-

sists of all these things and many more combined. As such, it is not fully taught in the mining schools, whether of Frieberg, Paris, Madrid, or any other. The graduation certificate of these mining schools are, therefore, of little value in determining the ability of a mining engineer. Accuracy of observation and truthfulness of report are among the most important characteristics of an engineer, because many mining operations are impossible without co-operation and capital, and these cannot be secured by men who are not accurate and reliable. Yet it is evident that these qualities cannot be acquired in school.

"Second: Mining is a secret art. This arises from the tremendous rewards of successful mining. There are men in this city who, but a few years ago, were poor and hard-working, yet who are now reputed to be worth from fifteen to forty million dollars each. Mining is not an unknown art; it is merely a secret one. There are plenty of men who can correctly answer most of the questions suggested in the above extracts, but who will not answer them, because it pays much better to keep them secret. Hence the answers do not find their way into books, and consequently are not easily accessible to the editors of newspapers. There are men so familiar with the mineralogical 'indications' in their particular district of country that a 'twist' in the 'grain' of the 'country rock,' or the peculiar color of a spar seam will cause them to go on or stop mining, or to change the direction of their explorations. Each country has its own peculiar geology, and this is so vast, so complex, and the knowledge of it so imperfect, that it is difficult to learn and useless to transplant. The mine capitalists of 1824–25 learned to their cost, that British steam-mechanics and Mexican horse-mechanics were two different arts, and American mine capitalists may learn a similar lesson at the present time."

Prof. J. Alden Smith, late State geologist of Colorado, said:—

"The business of mining should be conducted on the same general basis as ordinary mercantile and manufacturing pursuits; men of experience only should be allowed to manage mining properties, and not schoolmasters. It requires three times the experience, and four times the preparatory study, to successfully manage a mine, that it does to run a wholesale grocery or a woollen factory. There are dozens of mines in Colorado which have paid dividends ranging all the way from thirty to sixty per cent annually, for from five to twelve years consecutively, of which the general public has heard absolutely nothing. An instance came under my notice not long ago, where

seven thousand seven hundred dollars ($7,700) was invested in a property by a man of practical education, and the investment was returned inside of eighty-five days. Another practical manager returned to the owners of a certain mine, of whose existence the public is ignorant, a net profit of twenty-two thousand five hundred dollars ($22,500) out of a gross product of twenty-five thousand dollars ($25,000)."

We would not convey the idea that there is never anything like

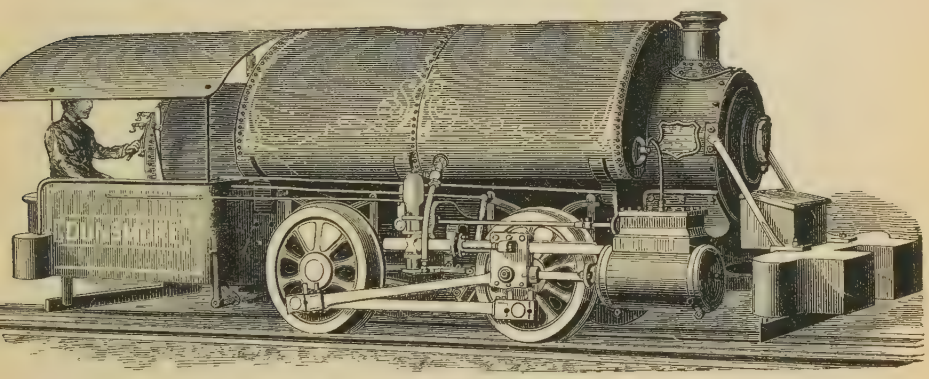
GOLD-DIGGER AND DEER.

what men call "stumbling upon a mine." We have already said that gold was first discovered in California and Colorado by men who were not searching for it. This, however, is not the rule, but the exception. We might fill a long chapter with these exceptions; but the narrative would be brief in comparison with the volumes in which are recorded the achievements of patient research and scientific mining.

It is related of an early adventurer, who drifted with the crowd to Leadville in 1878, that, after a vain endeavor to discover gold by his wits, poverty and despair got the better of him. He awoke one

morning without food or money, and canvassing his situation, he resolved to go out and shoot some sort of game to supply present and pressing necessities. He shot a deer; and the animal, in his dying agonies, kicked up a parcel of dirt that disclosed the presence of gold. The poverty-stricken prospector opened his eyes when this proof of a mine was kicked into his face, made sure of his "claim," and opened one of the most profitable mines ever worked in that locality. He was more indebted for his good fortune to the heels of the deer than he was to the "School of Mines."

In the days of gold-excitement in California, three prospectors jointly engaged in mine-hunting with scarcely any success for months. Good news coming from another locality, they packed up their tools



MINE LOCOMOTIVE.

and started. On the way, they found the dead body of a man whose errand to that part of the country was like theirs, without doubt.

"Poor fellow!" said one of the men, "he has passed in his checks!"

"Let us give him a decent burial," proposed another of the men; "some wife or mother will be glad, if she ever knows it."

"All right," responded the third prospector; "it will be a humane deed, to say the least."

So the three set to work with a will to dig the dead stranger's grave. Three feet from the surface they found evidence of gold; and the result was that they opened a gold mine there instead of a grave, and buried the stranger in another place. To that date their wits and industry did less for them than their humanity.

There was a claim in Leadville called the "Dead Man Claim." The mine and the name came about in this way. A miner died when

there were several feet of snow lying on the ground. His comrades wished to give him a respectable burial, so they hired another to dig his grave for twenty dollars. In the meantime, they laid the dead man away in a snowbank for safe keeping. When the grave-digger had been absent three days and no report from him had been received, a search was instituted, and he was found digging a mine instead of a grave. In excavating the grave, he struck a rich mine, and in his great excitement forgot the corpse and his bargain, intent only upon making his fortune. He had been an unsuccessful prospector, growing poorer and poorer from month to month, but now he "struck it rich" when he was thinking only of getting twenty dollars to keep up the connection between his soul and body.

FINDING GOLD BY ACCIDENT.

Into the little town of Rosita, Col., there came an old miner, in 1877 or 1878, who had been an unsuccessful prospector in Australia. He returned from that far-off country without a dollar to his name, and hied away to the gold-fields of Colorado. For some months he applied himself industriously to prospecting, but without success. He was so poor and "unlucky" that he became depressed and melancholy. But one day he seated himself upon a stone, and proceeded aimlessly to strike another stone at his feet with his pick. He was altogether forlorn and hopeless; and he was revolving his bitter

experience in his thoughts. Unexpectedly he chipped off a piece of the rock he was so thoughtlessly pounding. The chip startled him; for his eye caught the evidence of a rich deposit of gold. He caught up the broken piece with delight, examined it closely to be sure of the truth, and sprang to his feet. It was gold! gold! a rich find, too! — the first in all his prospecting and wanderings to gladden his heart.

PLACER MINING.

He hurried into the town, and went directly to an acquaintance, to whom he showed his specimen, and offered to take him in as partner for *twenty-five dollars*. His friend declined, whereupon he hastened to the assay office, where a load of wood had just been dropped. He agreed to saw the wood to pay for assaying his samples. The result more than satisfied his wildest expectation. He took out of that mine ($450,000) *four hundred and fifty thousand dollars*, and then sold it for ($300,000) *three hundred thousand*, and ($1,000,000) *one million in stocks*, — the best return an aimless blow

ever received. Doubtless the fortunate man called his experience "luck."

"Honest John," as he was called, a noted Idaho character, was out hunting, when he wounded a deer. He gave chase after the wounded creature through wood and glen, and finally stumbled over what proved to be a rich lode. The appearance of the earth attracted his attention, whereupon he instituted a careful examination, which resulted in the discovery of a rich mine. He named it Elkhorn; and within six weeks he was taking *fifteen hundred dollars* a day out of it. The mine yielded *one hundred and fifty thousand dollars* in 1882, *three hundred thousand* in 1883, and has continued to enrich its owners to this day.

Placer mining first enlists the attention of gold-seekers, because it is easiest, most accessible, and makes prompt returns. It consists in washing the surface dirt. We saw that the thousands who invaded California in 1848–49 engaged at once in this sort of mining. The cut on p. 445 represents them at work with pan and shovel, the former about the form and size of an ordinary tin pan. When the process of washing the gold from the dirt is remunerative, the miner says "it *pans out* well." His pan furnishes the figure.

As compared with lode mining, there is no outlay to be made in the outset, and no risk to run. At the close of each day the miner knows just the amount he has earned. He may be entirely ignorant of practical and scientific mining, but he knows enough to separate gold from the surface dirt. He may be as poor as Job's long-eared companion, but his muscle and perseverance give him as good a chance as his more well-to-do co-worker enjoys. Poverty stands abreast with competency in this kind of work; or poverty may sift dirt as fast, and perhaps faster, than competency.

We have seen, also, that gold-seekers in Colorado, in 1858–59, devoted themselves to placer mining in Boulder, Gilpin, Park, Summit, Lake, and other counties. Here they could work but five or six months of the year on account of the severity of the weather; but *one million* a season was the average amount of gold secured for several years. Indeed, California Gulch alone, where three or four months of labor covered the working season, turned out *one million* each season for a series of years.

The gold gathered by placer mining has been washed down from the mountains, through past ages, into the creeks, rivers, and gulches. Much of it works through the loose gravel down to the bed of rivers, where miners find the richest deposits.

The rocker, sometimes called "cradle," is about as primitive as the *pan* in placer mining. A good illustration of it is found below, showing also the method of working it. It is simply a box about four feet long, mounted on rockers and furnished with graded sieves. The gold dirt is placed in the hopper, where the water is also poured, and, by the use of amalgamated plates and blankets, the gold is separated from the dirt as it is washed down from the hopper into the box. It is still in use in certain localities, as on river-bars, where other methods are not practicable.

THE ROCKER.

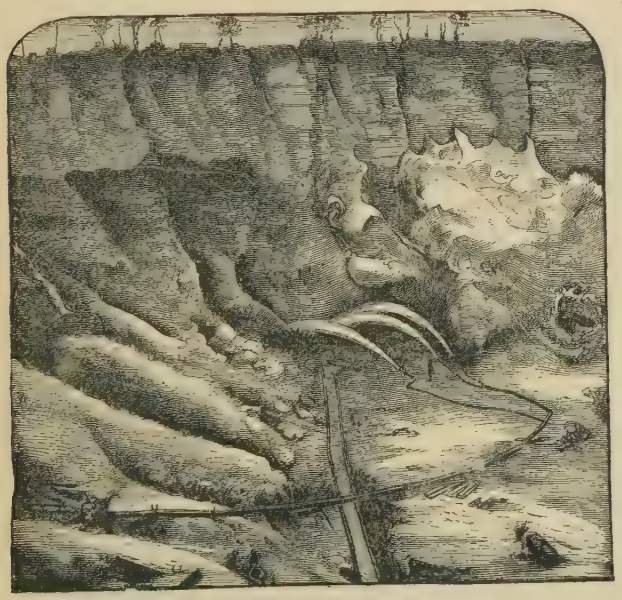
Of course there is a limit to placer mining. The gold is exhausted in time; and miners who are not prepared to engage in lode mining pack their traps and start for other placers. This includes the class who have not the enterprise or capital to engage in lode mining; and it is a very large class, too. When the crowd of placer miners left Boulder, Gilpin, and other counties of Colorado just named, in 1863, for other placers in the Rocky Mountains, even as far away as Montana and Idaho, some of the richest lodes were being worked in the counties which they forsook. The Bobtail, Gregory, Winnebago, Burroughs, Kansas, and a score of others, were yielding their thou-

GULCH MINING.

sands of dollars every month ; but the mass of stampeders had no love for this more difficult method of acquiring fortunes. Perhaps many of them really thought that the shortest cut to great wealth was through placer mining ; and so placers they must have. The word "placer" is from the Spanish, and means "content," "satisfaction" ; and this class appeared to be "content" with placers only.

In 1862 placer mining began in Montana, and in 1867 Alder Gulch alone, thirteen miles long, had yielded *sixty millions*. From 1862 to the present time the placers of Montana have turned out *two hundred and fifty millions*.

We have said that gold is washed down from the mountains into gulches and ravines, where the hydraulic method of securing it is brought into requisition. By this method water is carried long distances, often by ditches and flumes, to wash gold from the dirt on a much larger scale. The cut (p. 448) shows the flume and sluices, the latter being nothing more than boxes into which the gold dirt is carried by the swift-running water, where the presence of mercury in the bottom of the boxes attracts and separates the gold from the dirt. Once or twice a day, as the circumstances may be, the water is shut off, the boxes opened, and the gold secured. Sometimes a powerful stream of water is poured into the sides of the gulch, to wash out the earth into the flume in a large way. Hydraulic mining caused such immense damage in California by filling up rivers and covering farming lands with *debris*, that it has been suppressed by legislation, thereby largely diminishing the gold-product, and causing depression in business. It is claimed that the suppression of this mode of mining threw *twenty thousand men* out of employment. Many persons believe that the damage by legislation will be greater than the damage by the accumulation of *debris*.



GULCH MINING, IDAHO.

Above is an illustration of hydraulic mining in Idaho, where a mammoth nugget was discovered a few years ago, four inches long,

two and a half wide, and one inch thick, weighing nineteen ounces, twelve pennyweights, and eighteen grains.

In hydraulic mining, flumes are often carried across deep valleys, after the manner of railroad and highway bridges, as represented below.

LODE MINING.

Exhaustible placer mining was followed by inexhaustible lode mining, which embraces silver mining. Here it is necessary to sink

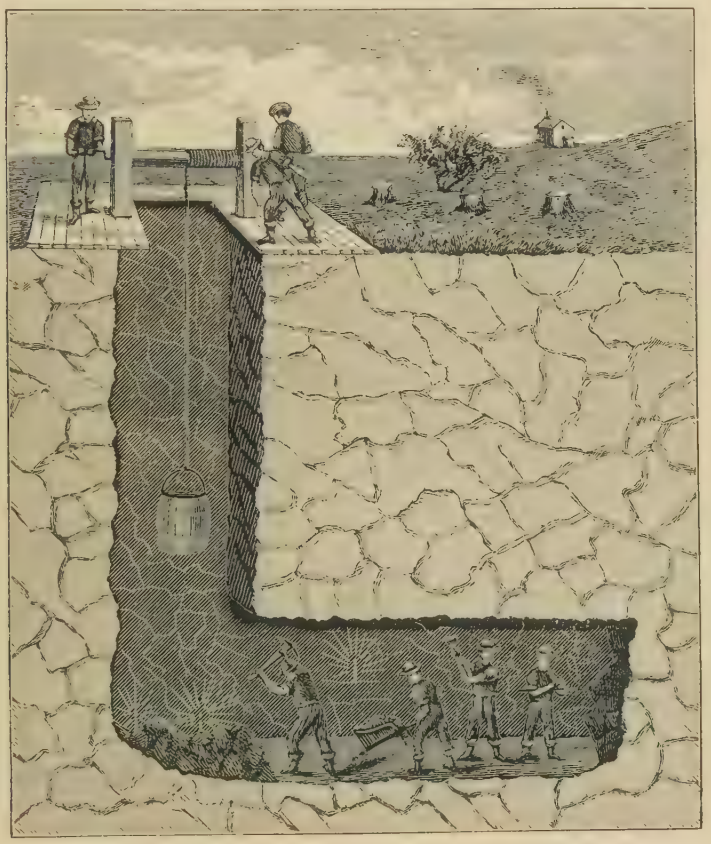
FLUME.

a shaft down into the bowels of the earth by drilling and blasting This is accomplished by hard work and great expense.

The next cut represents the perpendicular shaft into the earth, with two horizontal levels, or drifts. A windlass is erected at the opening of the shaft for the purpose of lowering and raising the bucket. Miners descend by the bucket or ladder. When a mine is excavated beyond seventy-five or a hundred feet, the windlass is no longer serviceable. Man-power is not equal to the task, and horse-power, with pulley or drum of timber, is called into requisition. At a greater depth, say two hundred or two hundred and fifty feet, steam-power is

required. When a large quantity of water hinders work in the mine, powerful pumps become indispensable.

A mine may have several drifts, according to its depth, and the drifts may be on both sides of the shaft. The cut on the following page shows two drifts on the right. Often the drifts extend a long distance, and railway tracks are laid, on which the ore is conveyed



LODE MINING.

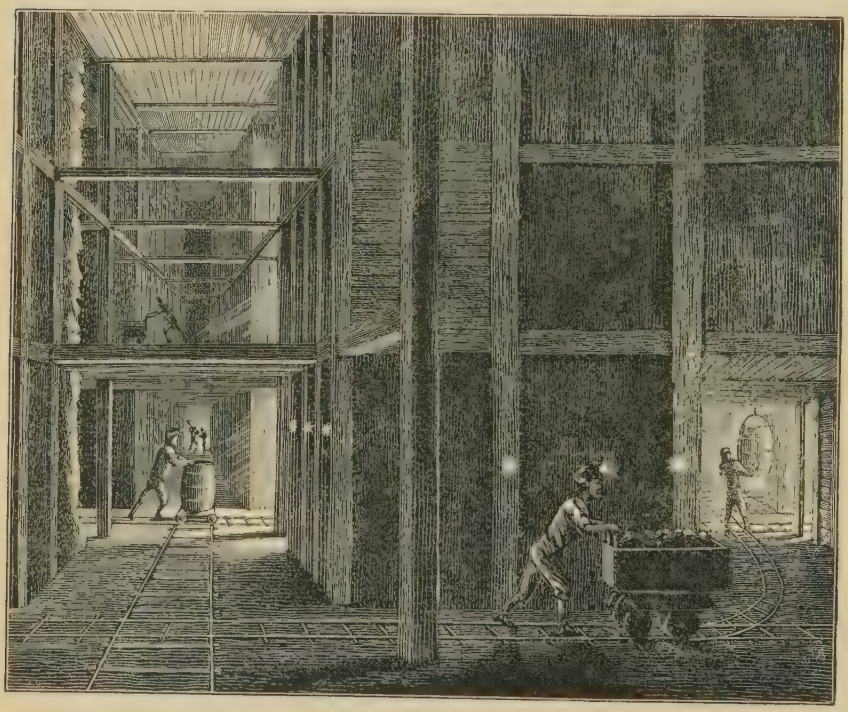
to the bottom of the shaft, whence it is lifted to the surface of the earth. The Chrysolite Mine of Colorado has from seven to eight thousand feet of drift.

The reader will observe that the mine is heavily timbered throughout. This is necessary in both shaft and drift to prevent caving, and assure safety to the miner who is obliged to adopt a subterranean life. It is a dark abode, so that the best artificial lighting is

required. The miner must wear a light on his cap, in addition to the reflectors which illuminate his underground workshop.

The depth of mines varies from fifty to twenty-five hundred feet. Many of them are one thousand feet deep. Several in Colorado are over thirteen hundred feet in depth; and there is one in Nevada sunk twenty-five hundred feet into the bowels of the earth. What a place for a human being to live and labor in!

On the next page, veins of gold or silver are represented, with shaft sunk so as to cut them, or to reach them by its drifts. The veins can be



UNDERGROUND RAILROAD.

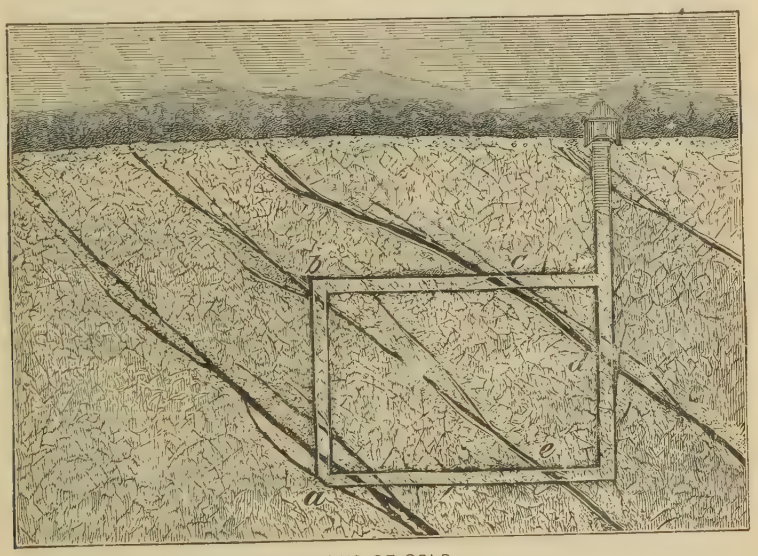
worked above and beneath, as well as at the sides, by the men in the drifts. A vein may extend to such a length as to make it practicable to sink several shafts.

When a profitable mine is fairly in operation, a building is erected over the entrance, provided with all the room and appliances necessary to carry on the work in summer and winter. For the change of seasons does not trouble the miner at work a thousand feet below the earth's surface, nor even the change of temperature. Summer and winter are about the same to him.

GOING INTO A MINE.

A. A. Hayes, Jr., has an amusing description of his descent into a Colorado mine, in his instructive book, "New Colorado," and we extract it for the entertainment of our readers at this point: —

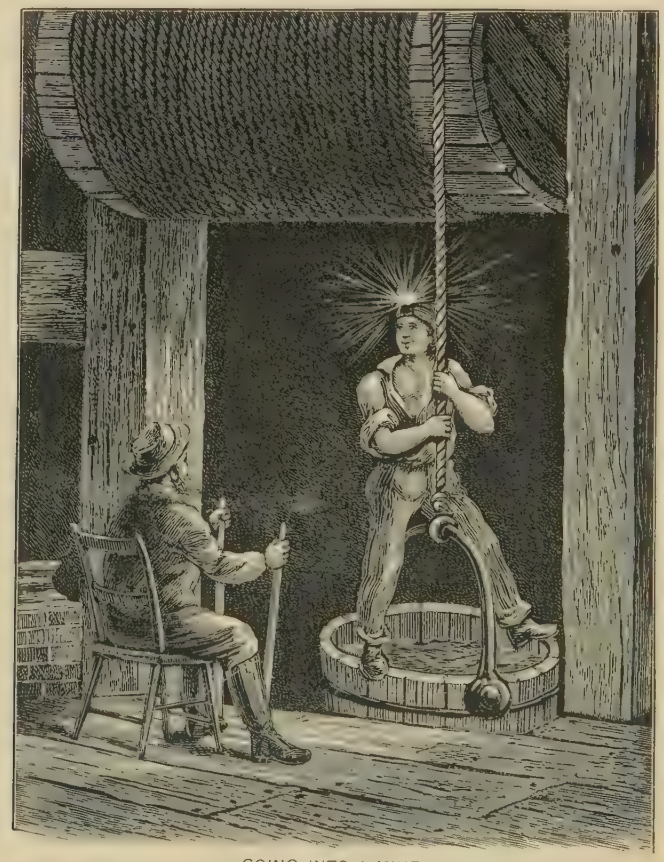
"Entering a rough wooden building, you see a steam-engine turning an immense drum, around which is coiled a wire rope. On a chair sits, with each hand on a lever, the bright, watchful engineer, his eyes fixed on the drum, now nearly covered with the coil. In another minute, click! the machinery has stopped, and out of an



VEINS OF GOLD.

opening in front, like Harlequin in a Christmas pantomime, has come a grimy figure, who stands there smiling at you, with a lamp fixed on the front of his cap, and his feet on the rim of a great iron bucket. He steps off, the bucket is emptied of the load — not of rich ore, but of very dirty water, which it has brought up — and there is an air of expectancy among the workmen, and an inquiring smile on the face of Mr. Thornton, the superintendent. Something is clearly expected of you, for it is established that you are not what is called by the miners a 'specimen fiend,' or unmitigated sample-collecting nuisance, and it is assumed that when you came hither to investigate you 'meant business.' You take the hint and follow Mr. Thornton to a room, where, amidst a good deal of joking, you put on some clothes — and

such clothes! If you have one spark of personal vanity, 'all hope abandon, ye who enter here,' for even your kind guide has to turn away to hide a smile when he sees you in overalls which will not meet in front, and are precariously tied with a ragged string; an ancient flannel shirt, the sleeves of which hang in tatters around your wristbands, and a cap which might have come over in the *Mayflower*,



GOING INTO A MINE.

and has a smoky lamp hooked into its fast-decomposing visor. As you approach the mouth of the shaft, the engineer genially remarks that there 'ain't *much* danger,' and when the bucket has come up and been partially emptied, the bystanders repeatedly advise you to be careful about getting in. As you climb perilously over the side, you think of the Frenchman who, starting in the fox hunt, cried out, 'Take noteece, mes amis, zat I leafe everyzing to my vife!' And

when you are crouched down so that Mr. Thornton can stand on the rim above, you do not think at all, but know that you are what M. Mantalini called 'a dern'd moist, unpleasant body.' Mr. Thornton makes a grim remark about it being as well to have some matches, in case the lamps go out, gives the word, and down you go. Understand that there is just about room for the bucket in the shaft, that the latter is slightly inclined, and that you catch, and jar, and shake in a nerve-trying way; and understand further, that a person should carefully study his temperament and possible disabilities before he takes a contract to go into a deep shaft.

"At a certain depth — it may be five hundred or one thousand feet (in some Nevada mines it is two thousand five hundred) — you stop at side-drifts or cross-cuttings, in which men are at work; and here you see, walled in by rock, the fissure vein. Some are 'stoping,' or cutting away pieces with a pick; others holding the steel wedges; and others striking them tremendous blows with sledge hammers. They are, by the way, in the habit of accompanying these blows with gutteral sounds, the hearing of which induced a special correspondent of the gentler sex — ignoring the fact that they receive three dollars *per diem*, own chronometer watches, and have fine bank accounts, and silver-spoons on their tables — to write a soul-moving description of the poor, down-trodden miner, imprisoned far from the light of the blessed day, uttering terrible groans as he toiled his life away for the enrichment of the bloated and pampered capitalist! Other men, again, are drilling, loading, and tamping for the 'shots' which are to tear the rock in pieces: and you will probably remember a pressing engagement to 'meet a man' at some distance from the mine, and induce Mr. Thornton to ring for that moist car, and take you up before they light the match. Emerging from the shaft, clad once more in the garb of civilization, and thinking what a set of fine fellows you have seen, you will agree with the sagacious soul who said to the colonel and the commodore, 'Yes, there's a good many of them big-hearted fellows in this country. You see, them small-souled cusses *takes too much irrigation*[1] *to bring them out.* They've got to git up an' git!'"

In addition to the entertainment of the foregoing description, it is very instructive, and introduces the reader to some of the methods of mine life.

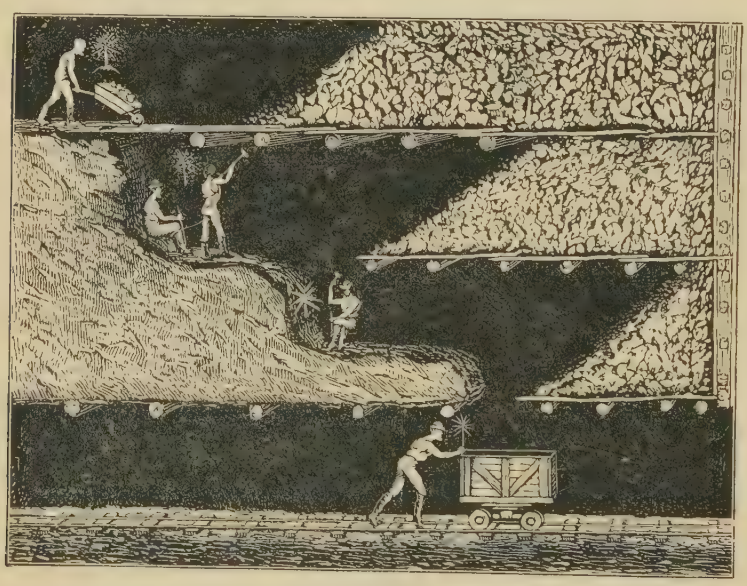
The next cut illustrates what Mr. Hayes refers to by the word

[1] Liquor.

"stoping." The glossary of mining terms defines it to be "the act of breaking down a stope [see definition of *stope*], and excavating it with a pick."

WEIGHTS, VALUES, AND MEASUREMENTS.

In his valuable history of Colorado, Mr. Fossett introduces many important facts concerning weights, values, and measurements connected with mining, which the reader will find of practical use. We copy them here, as we feel that it is almost indispensable for the reader to know them, if he would possess a comprehensive view of the subject in hand: —



STOPING.

"A ton of gold or silver contains 20,166.66 ounces.

"A ton of gold is worth $602,875.

"A ton of silver, at the standard rate of $1.29,29, would be worth $37,709.57; but at the present price of silver, $1.10 per ounce, it would be worth only $32,083.32.

"The standard of gold and silver for United States money is 900 parts of pure metal and 100 parts of alloy in 1,000 parts of coin; that is, a dollar is nine-tenths pure metal.

"Standard gold is worth $18.60,465 per ounce United States gold coin, $21\frac{3}{5}$ carats fine.

"Standard silver, $1.1636+ per ounce. The term 'fineness' expresses the quantity or proportion of pure metal in 1,000 parts.

"The value of an ounce of gold, pure, is $20.67,183, or approximately $20.67; 23.22 grains of pure gold equals $1. The standard gold dollar is 25.8 grains troy, and the silver dollar 412.5, and the trade-dollar 420.9 grains.

"Pure silver has 371.25 grains to the dollar; hence, the value of one ounce should be $1.29,29+, instead of the varying bullion price $1.10 or $1.15. Had the former been the ruling price, as in by-gone years, Colorado's silver product of 1878 would have had a valuation one million greater than it was.

"The British standard of coinage is 11 parts of gold to one of alloy, and of silver, 37 parts of silver to 30 alloy. Quotations of the price of silver on the British market is made on that basis, viz.: of $\frac{925}{1000}$ fine;' while American transactions are made in the pure metal. This accounts for the lower rates per ounce of the former.

"One pound 'troy' weight equals $\frac{822}{857}$ of a pound avoirdupois; 7,000 troy grains equal one pound avoirdupois; 437.5 troy grains equal an ounce avoirdupois; 175 troy pounds equal 144 pounds avoirdupois; 175 troy ounces equal 192 ounces avoirdupois; one avoirdupois pound equals 1.215,278 pounds troy.

"One troy pound equals 22.8156 cubic inches of water.

"One cubic foot equals 7.4805 gallons.

"One metre equals 39.370,797 inches, English measurement.

"One decametre equals 32.80899 feet, English measurement.

"One hectometre equals 328.0899 feet, English measurement.

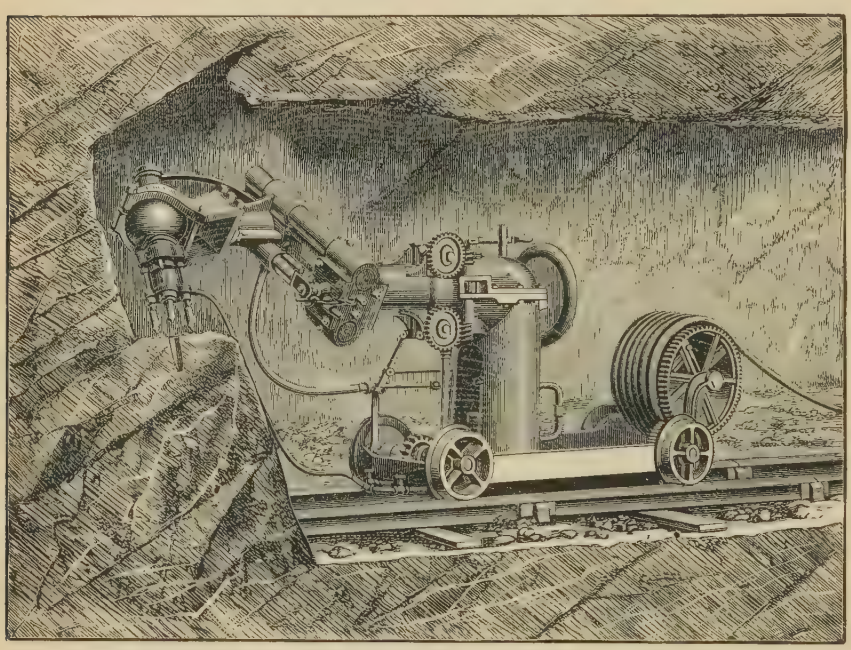
"One kilometre equals 3,280.899 feet, English measurement.

"It is estimated that the gold coin, bars, and bullion in circulation in the world are worth $3,500,000,000; equal to the debt of Great Britain. If this was in one mass, it would make a twenty-five foot cube. One cubic foot of gold weighs 1,200 pounds, and is worth not far from $300,000. Silver is about one-half as heavy as gold, — a cubic foot of silver weighing about 600 pounds, worth about $10,000. There is about the same value of silver in the world as gold; viz., $3,500,000,000."

We add, also, that a *carat* is a weight used by goldsmiths and jewellers. Originally the Kaura bean was used for this purpose, from which the name *carat* was derived. A *carat* is a weight of four grains, when used in weighing diamonds; and when used in reference to the fineness of gold, pure gold is supposed to weigh twenty-four carats of twelve grains each, and this pure gold is called fine.

Thus, if gold be said to be twenty-two carats fine, it is meant that twenty-two twenty-fourths are pure gold, and two twenty-fourths alloy. Coin is usually twenty carats fine; while gold used for ornaments and jewelry varies from eighteen carats down as low as twelve and even ten carats. The alloy is usually silver. Gold in its pure state is too soft for ordinary use.

E. B. Elliott, the government actuary, has computed the weight of $1,000,000 in gold and silver coin, as follows: —



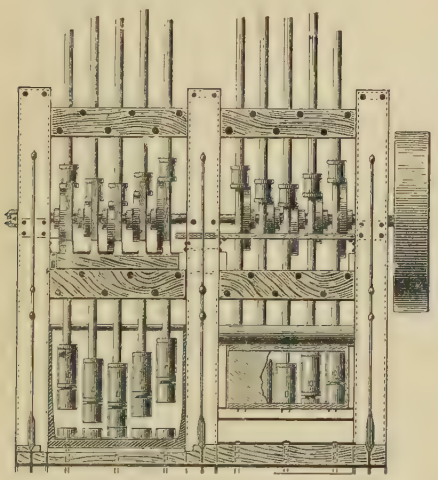
ROCK-BORING WINCH.

The standard gold dollar of the United States contains of gold of nine-tenths fineness, 25.8 grains; and the standard silver dollar contains of silver of nine-tenths fineness, 425.5 grains. In round numbers, the following table represents the weight of $1,000,000 in the coins named: —

Description of Coin.	Tons.
Standard gold coin	1⅔
Standard silver coin	26¾
Subsidiary silver coin	25
Minor coin, five-cent nickel	100

REDUCTION OF ORES.

When ores are brought to the surface of the earth, the metals which they contain are to be extracted therefrom. In this difficult art great progress has been made since the discovery of gold in California. At first only from fifteen to forty per cent of gold and silver was actually saved. The expense of extracting them was often too great to leave any margin for profits. The trouble was chiefly in not knowing how. For more than a quarter of a century capitalists in the mining business have been learning how, so that now a much larger per cent of metals is saved; and ores that formerly did not pay for working, now yield a handsome income. Remarkable improvement in machinery for reducing ores has been made in this period, illustrating the familiar maxim that "necessity is the mother of invention."



TEN-STAMP QUARTZ MILL.

First, there is the stamp-mill process, which has been used more or less from the start for the low-grade gold ores. The cut well represents the machine, and Mr. Fossett's[1] description of it, which we quote, will give the reader a correct idea of it.

"The stamp-mill process is very imperfect, but has been vastly improved during the past fifteen years, as far as operations in Colorado are concerned. At one time only from fifteen to forty per cent of the gold contained in the ore was saved, while from fifty to seventy per cent, and occasionally more, are saved at the present time. One mill claims a saving of over eighty-five per cent, including returns of buddled tailings. Blankets and pans help to increase the returns.

"The mill proper consists of a solid framework, heavy iron stamps and attachments, propelled by steam or water power by means of a horizontal shaft and connections. Mortars, inclined tables, and other accessories go to make up the contents of the establishment.

[1] Colorado, pp. 226, 227.

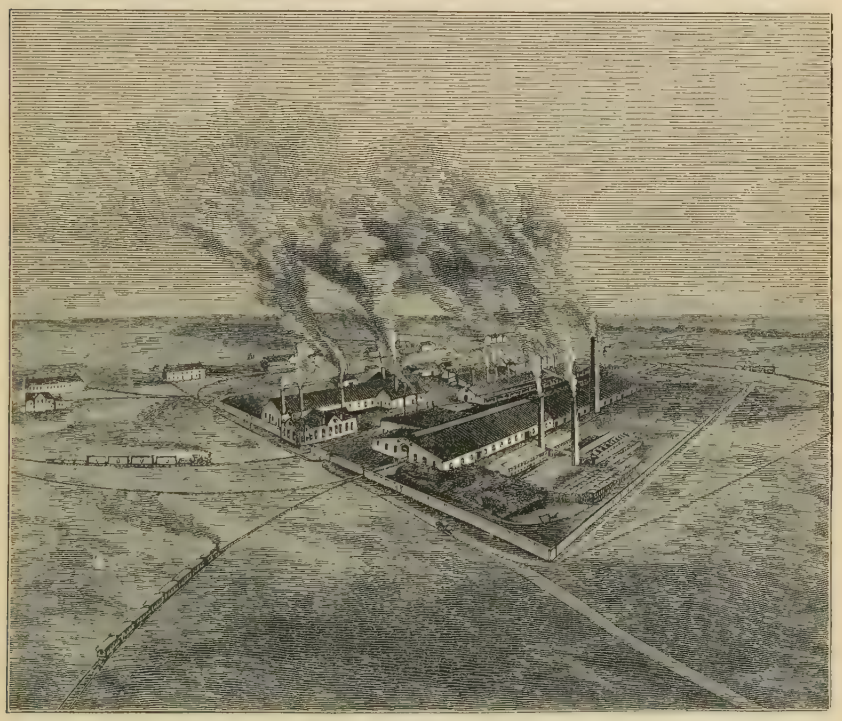
The framework is upright, as are also the iron stamps, which are made to rise and fall by means of cams, or arms, extending from the revolving shaft above. The stamps rise from twelve to eighteen inches, and drop on the ore in iron mortars or troughs beneath, from twenty-seven to thirty-five times per minute. These mortars are several feet long, and from twelve to fourteen inches high, and nine or ten deep, and rest on solid wooden foundations. They are placed between the upright wooden posts of the frame; the stamps, usually five in number, that rise and fall thereon, form what is termed a battery. The mortars are the receptacles for the ore, which is shovelled or fed into them as fast as it can be advantageously crushed by the stamps, at the same time that a constant stream of water flows in the same direction. Some mills have but a single battery of five stamps; others have ten or twenty, and there are some that have fifty and seventy-five.

"On the side of the mortars where the ore feeding is done, the framework is boarded up some distance, and on the other side are sheet-iron screens, through which the pulverized ore and water is forced on to the sloping copper-plated inclines or tables below. Quicksilver is fed into the batteries and on to the tables when the mill man deems it necessary. This retains most of the gold on the tables, while the pulp or slimes from the batteries are being carried onward by the water to the buddling tanks or stream beyond. The stamps are stopped, the water turned off, and the mortars and the plates of the tables are cleaned once a day, or once in several days, and the amalgam, or gold and quicksilver combination, is taken to the retort-room. Here it is skimmed and cleaned and pressed in a cloth, so as to get rid of as much of the quicksilver as possible; the remainder is retorted, and the crude bullion sold at the banks at from fourteen to eighteen dollars per ounce, or shipped in other ways. Gold from different mines varies in fineness and value, the quantity of silver accompanying it having much to do with this. The average fineness of Gilpin County bullion or retort gold is seven hundred and eighty-seven parts pure gold, one hundred and ninety-eight parts pure silver, and fifteen parts copper. The bullion obtained is from one-fourth to one-half of the amalgam, but rarely the latter. The quicksilver, after being condensed, is saved for future use.

"After the pulverized ore leaves the batteries it is usually washed over two sets of inclined tables, the lower ones being covered with blankets. Some mills use pans, modelled after the principle of an arrastra. The pulp or slimes, on leaving the mill proper, are gen-

erally worked over or concentrated by washing or buddling, when the concentrates are sold to the smelters. This often adds a dollar or two per ton to the total receipts from the ore. Formerly no effort was made to save anything beyond the tables. About one ton of these tailings can be saved and sold to every ten tons of ore crushed.

"The stamps used in these mills weigh from five hundred to seven hundred pounds, are generally ten or twelve feet high, and consist of a stem, head, shoe, and a collar, by means of which the cam raises



SMELTING WORKS AT ARGO.

them. The stem is made of wrought iron, and is from two to three inches in diameter, while the shoes attached to the lower part of the stem, and which come in contact with the ore, are thicker, and are made of steel or hardened iron. The stamps crush the ore to a pulp or powder, and much of the gold contained therein falls to the bottom of the mortars, and is taken up by the quicksilver placed there. Other portions of the gold are caught on the tables, blankets, and in the pans."

Many machines for crushing ores have been in use, but a few

only have proved effective. "Blake's Jaw Crusher" stands at the head of the list for thorough and extensive work. "Dodge's Crusher," and Allen's, also, rank high. Many an aspirant for the honor of bringing out the best machine for crushing has retired from the field at heavy pecuniary loss and heavier disappointment.

SMELTING.

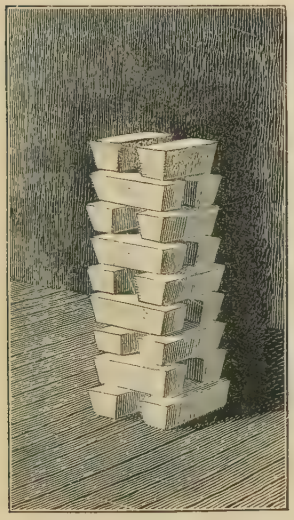
The richest ores are sent to the smelters, which have become numerous throughout the New West. Many and great improvements have been made in smelting ores within twenty years. The

GOLD AND SILVER.

first successful smelting establishment was erected by the "Boston and Colorado Smelting Company," at Blackhawk, in 1864, and was removed to Argo, two miles from Denver, in 1878. Hon. N. P. Hill is the general manager, under whose efficient direction the enter-

prise has been eminently successful. The sketch (p. 461) is from a photograph of the works.

The buildings occupy a lot of eight acres, all of which is enclosed by a high stone wall. Many cottages for the accommodation of the families of workmen have been erected within the enclosure. Two hundred and fifty men are employed in the works. The first building reached, after passing through the gate, is five hundred feet long and one hundred wide, used for crushing and baking ores. It has four crushers and twenty-four ovens. In the next building the ore is smelted by eight furnaces, capable of smelting one hundred and twenty-eight tons daily. From this building the smelted ore is conveyed to the next one, where the crushing and baking processes are repeated, before the product is sent to the tub and refining rooms.



A TON OF PURE SILVER.

The capital of this company is $1,500,000, and about half of a million in bullion is turned out monthly. More than *one million dollars* is the value of ores which the company constantly carries. Railway tracks are laid to the works from the Colorado Central, over which the immense freight is hauled. The Argo and Grant Smelters, of Denver, together employ from four to five hundred men, and the annual aggregate of their bullion product amounts to *twelve million dollars.*

The process of extracting and refining gold and silver results in producing the pure metal. The above cut shows a ton of pure silver in cakes or bricks of an average weight. When melted into solid bars, instead of bricks, the average weight of the bars is one thousand seven hundred ounces, valued at nearly two thousand dollars. Bars or bricks of gold range in value from fifteen thousand dollars to twenty-five thousand dollars.

LEADVILLE.

The most famous mining town in the world must be a marvel; and that town is Leadville. In the autumn of 1877 there were about three hundred souls within the township, including, perhaps, ten or twelve families. One year later there were six thousand inhabitants,

occupying about two thousand dwellings, such as they were. Rich gold mines were discovered, and the rush began. Before the close of 1879, it was claimed that the population of Leadville reached *thirty thousand.* The value of precious metals mined in 1878 was three and one-half millions; and in 1879, nearly *twelve millions.* Mr. Kent claimed, for 1879, that the above product was over thirty-one thousand dollars for each day of the year, over thirteen hundred dollars for each hour of the day, about twenty-two dollars for each minute, and thirty-six cents for each second, day and night, for the whole year. More than *five hundred thousand dollars* was sent by miners, in money-orders, through the Leadville post-office, to friends, in 1879. These money-orders were so many messengers, sent all over the land to proclaim that Leadville was the richest mining camp in the world. It was not strange that the tide of emigration setting thitherward increased in volume from month to month.

A large criminal class came with the crowd, but soon were forced to conform to municipal law, or move on to other fields. In less than two years from the time of opening the rich mines, the town could boast a strong city government, with ample means to maintain itself; well-organized police and fire departments; water-works to supply the city with water, and gas-works to supply it with light; one bank with deposits amounting to *eight hundred thousand dollars*, and another *six hundred thousand*, with exchange for 1879 amounting to *ten million dollars;* three daily newspapers; a free-school system established, and fine high-school building erected, with a competent and experienced educator for superintendent of schools; and four Protestant churches, with efficient pastors, together with a Catholic cathedral nearly completed, at an expense of *thirty thousand dollars.* All this accomplished in less than two years!

The Leadville of to-day is a well-ordered city of twelve thousand inhabitants, industrious, enterprising, and thrifty. The "floating population" has floated away, leaving the intelligent and reliable class to control and build up a town of grand possibilities.

The city is located between two lofty ranges of mountains, more than ten thousand feet above the sea-level, and therefore above the clouds, and hence called "the city of the clouds." Its streets are wide, and the chief ones are lined with as extensive and well-stocked warehouses as are found in Eastern cities. Indeed, few towns of its size in New England can boast of as large a music store as we saw on its principal street. Its public buildings — especially its opera-house — would be regarded with pride in the best

towns of the East. Its newest and largest hotel is represented below. It bears the name of Leadville's most successful capitalist and generous benefactor, — Hon. Horace A. W. Tabor, of whom the editor of the *Herald-Democrat* says: "He may justly be styled the father of Leadville. Having rocked its cradle in infancy, and sustained it generously through childhood,he is entitled to its allegiance and reverence in its maturity, both of which he unquestionably possesses."

The Grand Tabor is a large, costly hotel, built of brick, with stone trimmings, and furnished as elegantly as the best hotels east of the Mississippi.

TABOR GRAND.

A single fact illustrates the magnitude, cheapness, and reliability of Leadville's market. A new citizen desired to purchase a fine gold watch, and he wrote a friend in New York City to purchase it for him at Tiffany's. The friend called at that famous store, and made known his errand. The manager replied: "We will sell you a watch for your Leadville friend; but he can purchase just as good a watch of Joslin & Park, Leadville, as we can sell you, and get it just as cheap, and save heavy express charges." This fact was communicated to the citizen of Leadville, and the watch was bought in that city.

Leadville has been supposed by the Eastern people to be exceedingly mean, morally, — next door to the pit, possibly; but we assure

the reader that it is really a Christian city to-day, because its eight or ten active churches give tone and direction to public thought and sentiment. Vice is no more prevalent than it is in Eastern cities, and crime does not make so black a record as it does in numerous Eastern towns we might name. In the autumn of 1883, the writer walked through its principal thoroughfare after nine o'clock in the evening, and witnessed the same order and quiet to which he had been accustomed at home. True, the doors of saloons were thrown wide open, and they were thronged with miners from the suburbs; but the crowd was orderly and quiet. Just before our visit there, a member of the city government knocked down a man on the street, with whom he had an altercation; and forthwith he was arraigned by his associates, who, after due examination, moved to expel him from their body, and would have accomplished their purpose, had not legal counsel decided that only the people who elected could depose him. But the citizens accepted the will for the deed; and we assured one of them that such an honorable regard for the dignity and reputation of the city government was not possible in New York or Boston.

The banking business of this remarkable city is a prominent factor in its history. "The Carbonate Bank is the leading financial institution, established," says the editor of the *Herald-Democrat*, "less for the purpose of pecuniary gain than to furnish an absolutely safe depository for the large sums of money which it was necessary to keep at easy command, for use by mining and smelting men in their extensive financial transactions."

This authority furnishes the following facts taken from the books of the institution: —

"The amount of money received and paid to depositors, for the year 1885, was *over thirty-eight millions of dollars* ($38,000,000).

"The average deposits carried for the first six months of 1885, was *three hundred ninety-three thousand four dollars* ($393,004).

"The average amount of deposits carried for the second six months of 1885, was *four hundred ninety-one thousand one hundred forty dollars* ($491,140).

"The average daily cash balance carried for the twelve months of 1885, was *two hundred fifty thousand one hundred sixty-three dollars* ($250,163).

"The average per cent of available cash to deposits for the year 1885, was *fifty-seven per cent* (.57).

"The number of depositors at the present time is *ten hundred and fifty* (1050).

"The number of drafts drawn during the year was *eleven thousand three hundred thirty-six* (11,336).

"The total amount of the drafts drawn was *five million nine hundred seventeen thousand dollars* ($5,917,000)."

For 1891 the foregoing figures must be increased twenty-five per cent.

LOOKING WEST FROM PRINTER BOY HILL.

Leadville schools would be an honor to any city of New England. In February, 1878, the first school was opened in a rude log house, where thirty boys and girls were taught by Mrs. A. R. Undergraff. In eighteen months from that time, there were twelve public schools and thirteen teachers. One year later, there were twenty-one teachers and two thousand pupils. In May, 1881, an elegant school building, built of brick and highly ornamented with stone trimmings, was completed at an expense of *sixty-two thousand dollars*. It is eighty-one

feet long and seventy-nine wide, two stories high above the basement, the latter portion being devoted to play rooms, janitor's room, and office of the superintendent of the city schools. Each story of the building is sixteen feet high, the whole heated by four furnaces in the cellar, and supplied with water and gas pipes.

The erection of this schoolhouse was followed by the building of another at a cost of *forty-five thousand dollars*. In the autumn of '83, we found two additional schoolhouses (making four in all), which cost *forty thousand dollars* each. In five and one-half years from the time of opening the first school in the log cabin, we found, by personal observation, a complete system of graded schools, including a thoroughly equipped high school, with nearly two thousand pupils enrolled in four elegant buildings, with a corps of experienced teachers, whose services were obtained only by the payment of large salaries. To-day the schools of Leadville lose nothing in comparison with the best schools of the land. No teacher is paid less than twenty dollars a week; and the best-paid ones receive *forty-two dollars* per week. Most of them came from the East, where they had already won a reputation for skilful work in the schoolroom.

"But what of Leadville's output of gold and silver?" the reader inquires. It is this marvellous showing, of course, which especially interests the outside world. The city's great mining interest demands great facilities for business. Hence, everything is done on a magnificent scale, as the following facts prove:—

"There are fourteen miles of switches in the Leadville depot yards, including smelter yards and sampling works tracks.

"Four hundred and fifty cars are handled daily in the yards at Leadville, six consolidated engines, twenty-eight switchmen, and six yard conductors are required to perform this service, owing to the heavy grades, the maximum grade being three hundred and five feet to the mile and thirty degrees curvature.

On Jan. 1, 1891, ten years from the time the city was wholly dependent upon cattle teams, Leadville found itself upon the direct line of two great transcontinental railroads, with facilities as follows:—

Four passenger and six freight trains daily over the Atchison, Topeka, and Sante Fe Railroad (Colorado Midland).

Four passenger and eight freight trains daily over the Denver and Rio Grande Railroad.

Two passenger and six freight trains daily over the Union Pacific.

Two passenger and two freight trains daily over the Blue River Railroad (branch of the Denver and Rio Grande).

The first year that the mines of Leadville were really worked was 1879, since which time their yield has been as follows: —

1879	$10,333,740.69	1885	$12,357,662.00
1880	15,095,153.00	1886	13,750,733.30
1881	13,170,576.00	1887	12,072,967.81
1882	17,131,853.00	1888	11,605,205.48
1883	15,839,446.00	1889	13,639,351.75
1884	12,837,497.00	1890	11,798,892.84

The aggregate production in twelve years, ONE HUNDRED FIFTY-NINE MILLION SIX HUNDRED THIRTY-THREE THOUSAND SEVENTY-EIGHT DOLLARS AND EIGHTY-SEVEN CENTS ($159,633,078.87)! A marvel indeed.

The editor of the *Herald Democrat* said, Jan. 1, 1891: —

"The tonnage of the district, for the first ten months of the year, was greater than for any corresponding period in history, running up from 1200 tons a day in January to 1400 in March, and steadily gaining in volume until October, when the magnificent figure of 2000 tons a day was reached, when, for the reasons above stated, it began to steadily decrease, many mine managers deeming it unwise to stack up in their bins ore that could not be profitably marketed. Had the price of silver remained steady at the highest figure reached after the passage of the new law, — $1.19, or thereabouts, — and lead remained firm at the quotation of midsummer, the output of the Leadville district could easily have been swelled to $15,000,000. The mines did noble work for ten months, as we have said, beating all former records; but during the past two months the chief aim of the producers of certain grades of ore was to reduce output and curtail expenses. Thus, it will be seen, the causes for the depression that latterly existed, and that yet obtain to a certain extent, were not inherent in the mines, but was due to the manipulation of the lead and silver markets in London and New York. There can be no question as to the amount of ore now disclosed and blocked out in the mines of this district; while the new enterprises of the year are rapidly developing into mines on the line of ore chutes found and worked successfully in some of the older properties. So that it may be safely said that in the future, as the latter are gradually dropped from the list of those that have added their quota to the wonderful success of the entire district, other and equally good mines will be dropping into line and taking their places. The day when this will begin to occur is, as far as the older properties are concerned, still far distant; as during the past year there have been strikes of importance in quite a number of

them, while in others the ore bodies have been steadily opened out as the year's work has cut into and through them."

Facts appear to refute the opinions of many Eastern men, that the mines of Leadville will become exhausted within a few years, leaving the city without business or thrift. The authority just quoted says: —

"Professor Emmons made his second visit to Leadville during the past summer. He spent several weeks here reviewing his own work of ten years ago, with the aid and assistance of the leading mining men of the camp, and further assisted by the wonderful development of a decade. And while we are not privileged to anticipate what his report to the government will be, we hazard little in predicting that it will be most favorable to the theory — now almost passed into the realm of demonstrated fact — that the ore deposits of the Leadville district are practically unlimited, and that mining the precious metals will be successfully carried on here when the actors now upon the stage are dead and forgotten."

Mr. Max Boehmer, mining engineer, says: —

"Leadville is yet in its swaddling clothes. Taking a general view of the mining situation in Leadville, as it exists to-day, it can be said that the great ore zone has hardly been scratched on the surface; and not only that, but the scratches have been made only in a few isolated spots, where ore could be readily and with little difficulty reached. The producing district, comprising an area of about 30 square miles, is, however, only a portion of the great ore belt extending many miles north and south. The vein itself extends so far north as Taylor Hill, a distance of 12 miles from Leadville. In this hill low-grade bodies of gold-bearing ore have been found on top of the blue lime, the horizon of the Leadville vein. The same vein is found as far south as Weston Pass, a distance of ten miles from the city. Not only has the country been poorly prospected, but what little has been done has been conducted on a wrong plan. Prospectors took it for granted that they should look for ore only on top of the blue limestone. Recent discoveries tend to show that the large ore bodies exist under and in this formation; and if it is prospected better, the results obtained will bear out the assertion. The outcroppings of the rocks at the mouth of the gulches prove that the glaciers did not cut deep enough to erode the vein under the town; and there should be no hesitation in sinking a deep shaft on Harrison Avenue."

The business of one ore-factor and broker in Leadville amounted, in 1890, to the enormous amount of $2,737,854.55.

Horace A. W. Tabor was a merchant in Leadville, selling such goods as miners required. One day two men called upon him, — August Rische and George T. Hook, — signifying that they had abandoned shoemaking for gold-hunting, and found themselves without money to prosecute their purpose. After considerable discussion about the mining business and future prospects, Tabor agreed to fur-

FRYER HILL.

nish them with an outfit, which would amount to about seventeen dollars each, and provide them food, for one-third interest in their discoveries. The two men went to work with a will, and when they had sunk a shaft twenty-six feet, mineral was found so rich that a wagon load of ore sold for two hundred dollars. They christened the mine Little Pittsburg, and Tabor became a rich man. Within four or five months they extracted three hundred and seventy-five thousand dollars ($375,000) from the mine, and purchased every

available mine they could in the vicinity. The Minnemuck, near by, yielded one hundred and twelve thousand dollars ($112,000) in forty-nine days. At this juncture, the owners of the Little Pittsburg, New Discovery, Dives, and Minnemuck united their interests under the name of Little Pittsburg Consolidated Company, with capital stock of *twenty millions* ($20,000,000). From this time the yield was enormous. The productions of the mines belonging to this company amounted to the almost incredible sum of *two million six hundred ninety-seven thousand five hundred thirty-four dollars and ninety-one cents* ($2,697,534.91) within eighteen months.

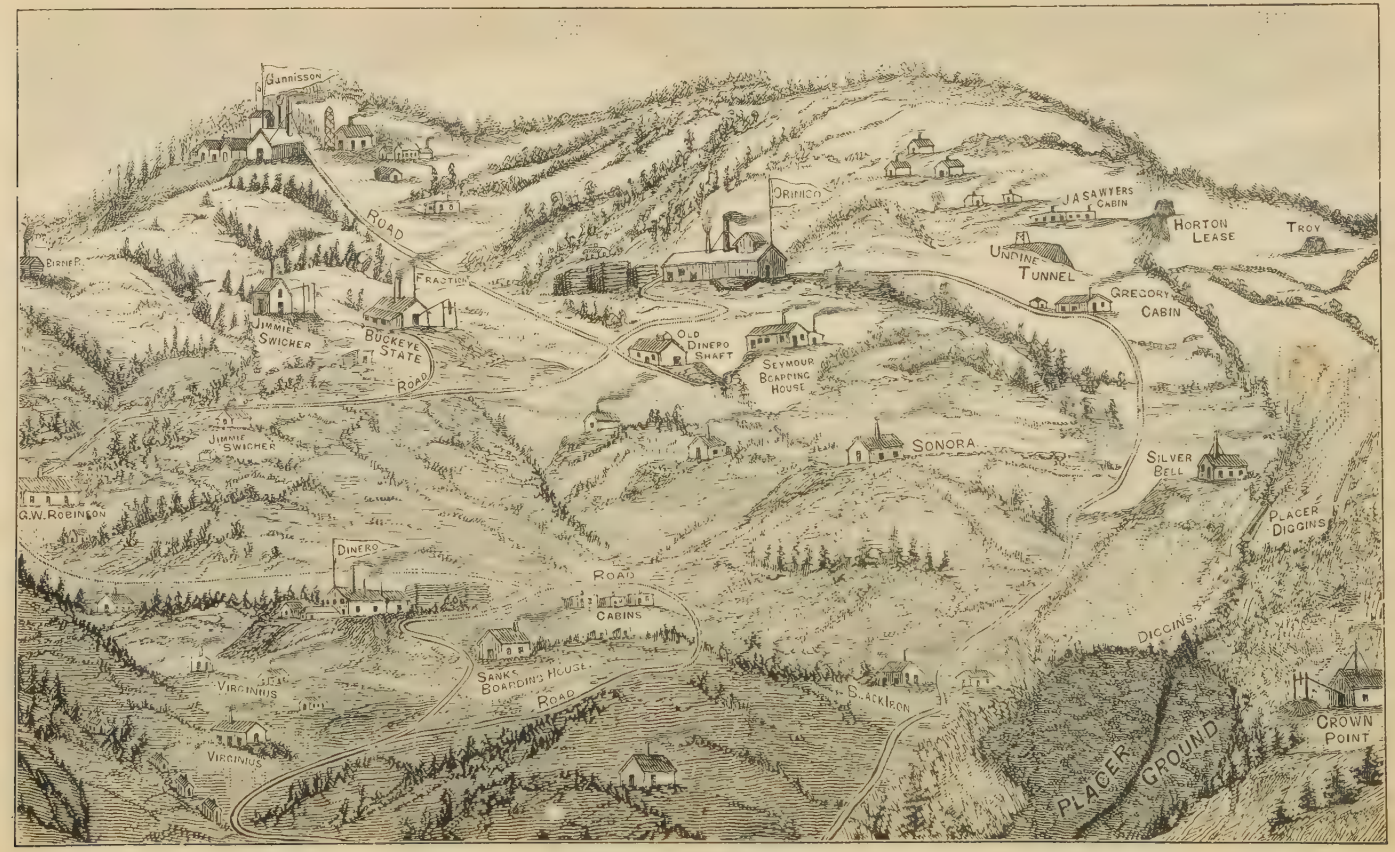
In the eleven months immediately preceding April 1, 1880, the ore sold amounted to *one million five hundred ninety thousand two hundred thirteen dollars and eighty-one cents* ($1,590,213.81). The profits were *one million two hundred ninety-one thousand five hundred seventy-eight dollars and forty-seven cents* ($1,291,578.47).

The Chrysolite mine is another bonanza. After yielding more than half a million dollars within four or five months, it was united with several other valuable mines under the name of Chrysolite Consolidated Company, with capital stock of ten millions ($10,000,000), swelling the amount of product, in a few months more, to *one million five hundred ninety-four thousand three hundred sixty dollars and forty-seven cents* ($1,594,360.47).

The Little Chief was located by four poor, hard-working men, who took from it *one hundred thousand dollars* ($100,000) within three or four months, and then sold it to J. V. Farwell, of Chicago, for *three hundred thousand* ($300,000). The total product of this mine to April 1, 1880, was *two million four hundred seventy-three thousand eight hundred fifty-seven dollars and ninety-eight cents* ($2,473,857.98). When it was paying monthly dividends of one hundred thousand dollars, it was sold to a New York company with a capital stock of *ten million dollars* ($10,000,000).

The Amie is situated on the summit of Fryer Hill. It was discovered in the summer of 1879, and soon after the Amie Consolidated Mining Company was organized, with capital stock of *five million* ($5,000,000). Within six months the yield amounted to half a million dollars.

The Morning Star did not promise well at first, and was sold to Governor Routt. The energy and labor which he put into its development soon converted it into a bonanza. In the summer and autumn of 1879, its product was *two hundred ninety thousand four hundred ninety-one dollars and twenty-six cents* ($290,491.26). In



SUGAR LOAF MOUNTAIN.

January, 1880, its yield was $70,600; in February, $70,000; in March, $75,000; and in April the Morning Star Consolidated Mining Company was organized, with a capital stock of *six millions* ($6,000,000).

The Dunkin opened well in the summer of 1879, and in two or three months yielded $35,000, when it was sold to ex-Governor A. H. Rice and Hon. John B. Alley, of Massachusetts, and Hon. James G. Blaine, of Maine, for $300,000. The ore bodies of this mine range from one to twenty-seven feet in thickness, and the ore yields from fifty-eight to two hundred and seventy-four ounces per ton, and from ten to sixty per cent of lead.

The following paragraph, interjected here from Fossett's "Colorado," furnishes important information respecting the ores of Leadville: —

"The ores of Leadville district are treated by smelting without roasting, nature having obviated the necessity of the latter. The same method has long been in use in Missouri, Utah, and elsewhere. Ores are smelted in what are known as water-jacket furnaces, constructed of iron, of circular or square shape, six feet more or less in diameter, and of much greater height. They are lined internally with fire clay and rest on a cement and clay foundation. The ore is shovelled into the furnaces along with the necessary proportions of coke, charcoal, and slag, from a floor over that where the bullion is discharged, the furnaces being uprights and extending upwards through the building, with outlets for fumes and smoke above. The proper mixture of ores and fuel are important points to success, and the more refractory the ores the greater the care needed to avoid chilling the furnace and other troubles. Weighing the ores is one means of determining their character, as the per cent of lead can thus be approximated. The molten mass separates itself in the furnace according to its specific gravity, the lead with its silver contents settling into a lead well at the bottom and one side, from which it is dipped into iron moulds, where it cools into bars of about one hundred pounds weight. Furnaces are run night and day from one month's end to another; to allow them to cool down would entail a heavy expense in drilling out the mass of iron and slag that would have to be removed, and in fact would stop business completely."

But the most famous of all the mines of Leadville is the Robert E. Lee. It is claimed that no mine in the world ever yielded silver ores of so high a grade. It embraces about five acres of ground. The whole property was originally purchased for $7000. In August,

1879, work was pushed, and at the depth of one hundred and fifty feet the richest silver ore in the world was discovered. Other silver mines had surprised the most credulous; but the unsurpassed richness of this mine was well-nigh incredible to many. The first three months *four hundred ninety-five thousand dollars* ($495,000) were taken out. In October, *one hundred twenty-five thousand dollars* ($125,000) were taken out in ten days, the ore yielding 520 ounces of silver per ton. In January, 1880, the yield reached the extraordinary amount of *three hundred one thousand four hundred ninety-four dollars and seventy-nine cents* ($301,494.79). On the 13th day of January, 1880, there were taken out in twenty-four hours $118,500, the average of the ore being $1200 a ton. Two tons yielded 23,678 ounces of silver, or 11,839 ounces per ton. From the middle of August, 1879, to Feb 1, 1880, *one million* dollars were taken from the mine.

Mr. Kent says: "On the 3d of January, six out of the seven owners inspected the mine and gazed in wonderment upon the astounding wealth of recent developments. Mr. Sigafus, one of the owners and resident manager of the mine, offered his partners his check for $10,000 to be permitted to work for one hour upon a certain spot in the floor of one level where the rich crevice was exposed, agreeing to work with a pick only, and within lines drawn about a four-foot square. Pennock & Roudebush offered $200,000 for the privilege of working twenty men upon a shift for thirty-six hours, in a certain other named locality, and own the ore they could raise to the surface in that space of time. Both these offers were declined."

In conversation with a citizen of Leadville, who showed us valuable attention, we remarked: —

"It will not take long to exhaust many of these mines, I suppose."

"Not in your day, nor mine," he replied. "At first, it was supposed that a few months or years would exhaust even the best of them, but recent developments assure us that all such fears are groundless."

"Then new mines are being opened almost daily," we suggested.

"Yes, and we have only just begun to explore the earth beneath us," he continued. "Only a small per cent of our mineral lands are worked as yet. Science and experience are teaching us to mine more economically and profitably every year; and we shall be able to accumulate larger profits in future for this reason."

"We can scarcely expect to discover another Leadville," we interjected.

"Not so sure about that," he answered. "The best authorities say, from personal examination, that the Rocky Mountains are full of precious metals. I should not be surprised if another Leadville were discovered any day. Prospectors have as much encouragement to persevere in their work now as they ever had; and, indeed, I think they have more reason to be hopeful and expect great strikes than they had ten years ago."

"Well, I am glad to hear these views," we replied; "for, with Eastern people generally, I have supposed that the mining business was temporary as well as very uncertain. But I am fast getting enlightened. I have seen enough already to satisfy me that the poorest part of our territory — the Rocky Mountains — is the richest; and that the time is not distant when there will be more millionnaires in the New West than in all the rest of the country."

"I am not sure but that is the fact already," my friend replied; "at least, including those who get their riches here, but live elsewhere."

"I suppose you will go down into a mine while you are here," remarked a citizen of whom we were making inquiries. "To omit that in your visit to this mining camp would be the play of Hamlet with Hamlet left out."

"Well, yes, I should like to explore one of these mines," we replied. "Are visitors admitted at any time?"

"Not exactly. Some of them do not admit visitors at all; others admit them at specified times. I think the Morning Star admits them at any time, and that is one of the best mines to visit. If you never went down through a shaft into the bowels of the earth, it will be a great novelty to you."

"No particular danger, I suppose," we responded; "if there were, so many men would not be ready to go down to their work daily."

"No, no great danger; accidents sometimes happen, and they do on the surface of the earth," our friend replied. "They will provide you with a suit of clothes, without much regard to style or personal appearance; for it is a wet, nasty place through which you descend into a larger and dirtier world below. You will scarcely know yourself when you are arrayed for the adventure; you will *look* extremely comical, whether you feel so or not."

"Well, I think I will try one of the mines," we added; "I shall scarcely feel satisfied to return to the East without seeing the inside

of a mine. To come two thousand miles to see a mine, and then not see one, won't pay."

An hour afterwards we were on our way to the Morning Star, when we met a good-looking man of middle age, whom we accosted.

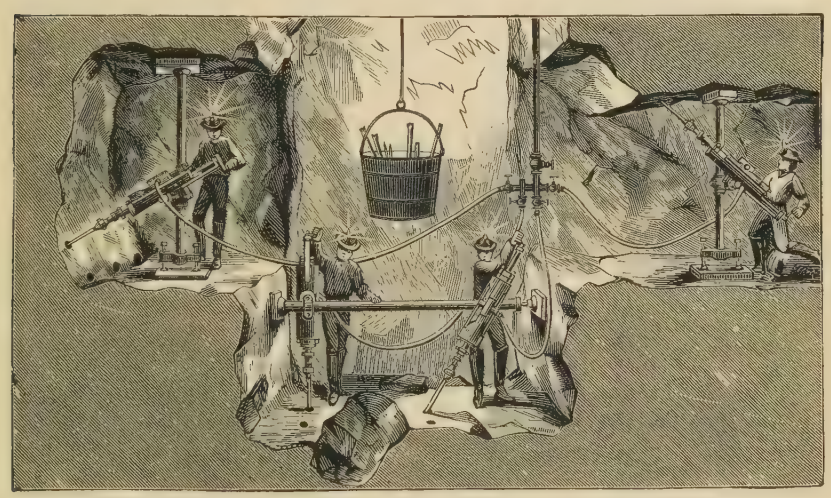
"Are you a citizen of Leadville, sir?" we asked.

"Yes, sir; I am one of the pioneers; came here with the rush five years ago," he answered very cordially.

"I propose to go down into a mine, and started for the Morning Star," we continued. "Am I in the right way?"

"Yes, you are right; and if you want to descend into a mine, you may; but I don't," he answered.

"Then you are not connected with the mining business?"



DRIFTING AND SHAFT-SINKING.

"No, I am a trader; and I have never been down into a mine since I have lived here, and never expect to."

"You surprise me," we replied; "I supposed that nearly everybody in Leadville had explored one or more mines."

"Quite the contrary; some of us think too much of our lives to make the adventure until we are compelled to. It is a wet, nasty, dangerous feat, and I rather be excused."

"How is that? I was not aware that there was any particular peril to life or limb," we added.

"Perhaps there is not; but my taste is not in that direction," said the stranger smilingly. "To ride in a bucket down into the earth five hundred or a thousand feet has no attractions for me."

By this time the adventure had little attractions for us, and we thanked the outspoken man for his kindly words, and passed on. But we did not reach the Morning Star. We concluded to leave Hamlet out of the play. What if I should not know myself when arrayed for the descent into regions below, and, being among strangers, no one there to introduce me! What if I should more than fill the bucket and slop over! More than two thousand miles from home, and five hundred feet from daylight! We concluded that we should live just as long, if not longer, by continuing our life on the earth's surface.

PROFITS OF MINING.

In 1881 a competent party made the following estimate of the profits of mining in Colorado: —

"1. The population of the State of Colorado is 195,234.

"2. The number of the population of the State who are voters is 53,420.

"3. It is not reasonable to suppose that more than one-third of the men in the State are engaged in mining and smelting. This number would be 17,804.

"4. Supposing that they labor during an average of two hundred days in the year at $2.00 per day, this would give as the cost of the total production of the State $7,121,600.

"5. Add to this interest on improvements amounting to $20,000,000 at six per cent — equal to $1,200,000 — and we find the total cost to be $8,321,600.

"6. But the total production of the precious metals in Colorado during the year 1880 was $24,000,000.

"7. It follows, then, that after paying the cost of labor and six per cent interest on the money invested in plans for mining and reduction, there was a profit remaining of $15,678,400.

"8. It is thus shown that the average cost of producing a gold or silver dollar in Colorado during the past year was less than forty cents."

Experience, improvement in machinery, and other facilities have reduced the expense of mining, so that good authorities claim that a dollar, gold or silver, costs but thirty-three cents. During the next five years that elapsed after the above estimate was made, Colorado's production of gold, silver, lead, and copper was *over one hundred million dollars* ($100,000,000). The cost of gathering this harvest was about *thirty-three million dollars* ($33,000,000), leaving a profit to the

State of *sixty-seven million dollars* ($67,000,000). As the output of the State has been over *three hundred fifty million dollars* ($350,000,000), since the rush to Pike's Peak in 1859, the profit, allowing forty cents to be the cost of a dollar, would amount to more than *two hundred ten million dollars* ($210,000,000). Allowing the cost of a dollar to be thirty-three cents, the profits would reach nearly *two hundred thirty-five million dollars* ($235,000,000).

The mining product of Colorado from 1881 to 1887 was as follows: —

1881	$22,203,508.72
1882	26,750,898.00
1883	26,376,562.00
1884	20,250,000.00
1885	22,500,000.00
1886	26,794,688.00
Total	$144,876,656.72

The mining product of Colorado from 1876 to 1880 was as follows: —

1876	$6,191,907.82
1877	7,216,283.53
1878	10,008,116.00
1879	19,110,862.00
1880	23,500,000.00
Total	$66,027,169.35

From the discovery of gold in Colorado to 1887, the output has been as follows: —

MINING PRODUCT OF COLORADO FROM 1859 TO 1891.

YEAR.	GOLD.	SILVER.	COPPER.	LEAD.	TOTAL.
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Prior to 1870	27,213,081.00	330,000.00	40,000.00	...	27,583,081.00
1870	2,000,000.00	650,000.00	20,000.00	...	2,680,000.00
1871	2,000,000.00	1,029,046.00	30,000.00	...	3,059,046.00
1872	1,725,000.00	2,015,000.00	45,000.00	5,000.00	3,790,000.00
1873	1,750,000.00	2,185,000.00	65,000.00	28,000.00	4,028,000.00
1874	2,002,487.00	3,096,023.00	90,197.00	73,676.00	5,262,383.00
1875	2,161,475.00	3,122,912.00	90,000.00	60,000.00	5,434,387.02
1876	2,726,315.82	3,315,592.00	70,000.00	80,000.00	6,191,907.82
1877	3,148,707.56	3,726,379.33	93,796.64	247,400.00	7,216,283.53
1878	3,490,384.36	6,341,807.81	89,000.00	636,924.73	10,558,116.90

MINING PRODUCT OF COLORADO FROM 1859 TO 1891 — *Continued.*

YEAR.	GOLD.	SILVER.	COPPER.	LEAD.	TOTAL.
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
1879	3,193,500.00	15,385,000.00	. . .	532,362.00	19,110,862.00
1880	3,206,500.00	18,615,000.00	. . .	1,678,500.00	23,500,000.00
1881	. . .	. . .	. . .	. . .	22,203,508.72
1882	. . .	. . .	. . .	. . .	26,750,898.00
1883	. . .	. . .	. . .	. . .	26,376,562.00
1884	. . .	. . .	. . .	. . .	20,250,000.00
1885	. . .	. . .	. . .	. . .	22,500,000.00
1886	. . .	. . .	. . .	. . .	26,794,688.00
1887–91 . .	. . .	. . .	. . .	. . .	100,000,000.00
Grand Total	. . .	. . .	. . .	. . .	363,289,723.99

Table showing the standing of fifteen of the best paying mines in Colorado, Jan. 1, 1885 : —

NAME OF MINE.	NO. OF SHARES.	CAPITAL STOCK.	DIVIDENDS PAID TO DATE.
Little Pittsburg	200,000	$20,000,000	$1,050,000
Bassick Mining Company	100,000	10,000,000	425,000
Chrysolite	200,000	10,000,000	1,650,000
Iron Silver	500,000	10,000,000	1,320,000
Little Chief	200,000	10,000,000	760,000
Dunkin	200,000	5,000,000	220,212
La Plata	200,000	2,000,000	610,000
Leadville Consolidated	400,000	4,000,000	390,000
Evening Star	50,000	500,000	1,400,000
Robinson Consolidated	200,000	10,000,000	700,000
Small Hopes	250,000	5,000,000	800,000
Morning Star	100,000	1,000,000	740,000
Moose Mining Company	200,000	2,000,000	550,000
Colorado Consolidated	65,000	1,625,000	251,875
Amie Consolidated	500,000	5,000,000	330,000

THE MARIPOSA ESTATE.

When California was under the dominion of Mexico, this estate was a grant by the Mexican government to Juan B. Alvarado, and it was purchased by Fremont in 1847. When, a year later, it passed

into the possession of the United States, Fremont presented his claim to the United States land commission, and it was confirmed in February, 1856, and the patent issued. Litigation followed, so that it was not until 1859 that Fremont came into full possession of the large property, which embraces an area of seventy miles square, or 44,380 acres. It extends twelve miles from east to west, and twelve and one-half miles from north to south. It includes the towns of Mariposa, Bridgeport, Guadalupe, Arkansas, Flat, Lower Agua Fria, Princeton, Mount Ophir, and Bear Valley.

As soon as Fremont's title was fully established, mining began on the property and the yield of gold was very large. The monthly production in 1860 was $39,500; in 1861, $53,000; in 1862, notwithstanding the great flood which interrupted mining for a time, $43,500; and in the first five months of 1863, $77,000. In March, 1863, $94,000 were taken out; in April, $92,000; and in May, $101,000. From that time the average monthly production amounted to about $100,000, with the promise of a still larger yield. Mining engineers prophesied the most marvellous results. One of them, Dr. J. Adelberg, said, in a report: —

"In regard to the value of the veins, I can say no more than that their yield in precious metal is limited only by the amount of work done in them; but I recollect Mr. Fremont once commissioning me to make an estimate as to their endurance in the limits of the longitudinal extent now opened. I found by calculation that they would yield for 388 years 100 tons daily, without the requisition of pumps. I mean down to the water level."

In December, 1862, Timothy C. Allen made a report upon the property, and said that the yield might be increased $100,000 monthly. Messrs. Makely & Garnett thought the property might readily be worked so as to yield $220,000 monthly, at an expense of only $50,000, leaving $170,000 the net monthly income.

These reports added to the fame of the Mariposa mines, and just then a company was organized in New York City to work them, with a capital stock of *ten million dollars* ($10,000,000). The company was formed by Fremont's creditors, who took a mortgage upon the property for *fifteen million dollars* ($15,000,000). Through mismanagement, the company ran into debt each month, notwithstanding the large production of the mines. At that time the property contained more than a thousand auriferous quartz veins, only thirty of them worked, and these only partially. The five months immediately preceding the organization of the aforesaid company,

the property yielded *three hundred eighty-five thousand dollars* ($385,000).

The Princeton was one of the mines on the Fremont grant, and yielded *ninety thousand dollars* ($90,000) a month for a time; and this was more than any other mine in California ever did. In five months of 1860 (from June 1 to Nov. 1), the mine yielded *five hundred twenty-seven thousand six hundred thirty-three dollars* ($527,633). In 1862 and 1863 its output was *two million dollars* ($2,000,000). In 1864 the yield amounted to *two hundred forty-three thousand seven hundred seven dollars* ($243,707). Within seven or eight years after Fremont's title to the estate was established, more than *four million dollars* ($4,000,000) were taken out.

The Oso mine proved very rich, and *four hundred thousand dollars* ($400,000) were taken from a shaft fifty feet deep and seven feet long on the vein.

The output of the Princeton, Mariposa, Pine Tree, and Josephine mines, in 1860, was $474,000; in 1861, $642,000; in 1862, $522,000; in 1863, $385,000, with $50,000 net per month; in 1864, $481,832, and in 1865, $230,000.

The Sonora produced $80,000 in May, 1865; in June, $84,000; in July, $95,000; in August, $102,000; in September, $91,000.

The total production of the Kincaid Flat to 1867 was *two million dollars* ($2,000,000).

Litigation stopped mining on the Mariposa estate, and left the property and buildings to idleness and decay. The director of the mint at Washington said, in his last report: —

"The affairs of the company became embarrassed, principally by bad management, and a long and vexatious litigation ensued which had the effect of closing the mines. During this period the machinery rusted, the buildings rotted, the shafts filled, and the tunnels and drifts caved, towns were nearly depopulated, and mining camps abandoned.

"This litigation having reached the highest courts, both State and Federal, and been disposed of finally in the State Supreme Court, it is anticipated that operations may soon be resumed."

It is claimed that Fremont realized from this Mariposa property *one million dollars*.

THE MOTHER LODE.

This Lode, much of which is covered by the Fremont grant, is regarded as the most remarkable metalliferous vein in the world. J. Ross Brown, in his report to the United States Government, says of it: —

"Others have produced and are producing more, but no other has been traced so far, has so many peculiar features, has exercised so much influence on the topography of the country about it, or has been worked with a profit in so many places. The great orgentiferous lodes of Mexico and South America, the most productive of precious metal of all known in history, can be followed not more than six or eight miles; while the Californian vein is distinctly traceable on the surface from Mariposa to the town of Amador, a distance of more than sixty miles."

"The chief peculiarities of the mother lode are its great length, its great thickness, its uniform character, the near proximity of large companion veins, of which at least one is usually talcose, and the richness of the talcose veins. In reply to questions about the chief distinguishing feature of the mother lode, the miners engaged in working various mines gave very different answers. One said it was the presence of a belt of green stone on the eastern side. Another thought it was a black putty gouge. A third spoke first of the occurrence of places as smooth as glass on the walls. Another considered the mother lode to consist of two branches, one the luminated, the other the bowlder branch. The former is usually on the west side; the latter has the most curves. The lode is richest where the two meet. Another still says the mother lode is a series of branches, sometimes a dozen in number, covering a width that varies from five hundred to three thousand feet, with a greenstone porphyry wall on the east, and dioritic porphyry wall on the west."

The mint director at Washington says of it: —

"It is, however, within the limits of Amador County that the mother lode makes its greatest presentation within defined wall structure and has been worked to the greatest profit. The Zeile, Keystone, and Plymouth consolidated companies are at present the most productive, the last named having yielded $600,000 in dividends during the year 1884 from the operations of their eighty-stamp mill. The above-mentioned mines have each a depth of one thousand feet or more, and have many years of reserves developed. The great slate

belt is found north of the Cosumnes River, in El Dorado County, but it here ceases to have the distinctive appellation of 'Mother Lode.'"

Sierra has developed into one of the richest quartz regions of the State. Notably among the reported quartz discoveries are the New River deposits of Trinity County, which have been, however, but partially developed. Many of these show high grade ore, and are found in geological formations which indicate permanency. The surrounding conditions are excellent, as the country is well watered and heavily timbered.

"Prior to the discoveries in San Bernardino County three years ago, silver mining in California was prosecuted with but little success; but since then it has steadily increased in importance. During the past year the recorded mines have kept up an increased supply of silver bullion, while many new properties have been located.

* * * * * * * *

"In addition to the great wealth of gold which California continues to pour in the world's coffers, and her vast reserves of silver only now beginning to yield their wealth, other useful minerals and metals abound in a variety probably unsurpassed; and as many of them have an influence on the production and refining of the precious metals, a brief mention of them may not be inappropriate."

SOME OF THE RICHEST MINES OF CALIFORNIA.

The Sheep Ranch mine, in Calaveras County, was discovered in 1865, and has been a large-paying mine ever since. It enriched its locators, who finally sold it for a fabulous price to parties who have worked it on a larger scale. It paid $18,000 per month.

The Standard mine, Mono County, has been a great producer. Although the year 1884 was considered dull, the mine turned out $267,777.16 in gold, and $36,517.60 in silver. Total, $304,294.76. This mine was opened in 1877, and in ten years its production reached the enormous sum of *ten million dollars* ($10,000,000).

The Bodie *Free Press*, under date of Feb. 14, 1885, gave the following statement of the grand total of bullion shipments of the Bodie district for the year 1884:—

Standard Consolidated	$304,294.76
Bodie Consolidated	617,310.18
Syndicate	155,244.36
New Standard	17,714.76
Bodie Tunnel	2,075.90
Wagner's Tailings, mill	17,600.00

Virginia Creek Hydraulic Company	$21,300.00
Scattering	8,630.00
Bodie ore	714.00
Total	$1,144,883.96

The Idaho quartz mine, in the famous Nevada County, yielded $364,599.85, in 1883, and $561,895.49, in 1884. The dividends in the latter year amounted to $271,250.

The principal mine of the Bloomfield district, Nevada County, belongs to the North Bloomfield Mining Company, and they report the product for 1884 $483,187.57.

The Eureka, in Plumas County, yields $35,000 per month, on the average, and promises more largely to-day than ever.

Eight years ago there was discovered in this county one of the most remarkable mines of California. It was at Eagle Gulch, and the *Greenville Bulletin* said of it: —

"The recent strike at Eagle Gulch is something so great that a bare statement of facts would read like the wildest romance. One of the owners of the mine with a hammer and chisel cut out one solid lump of gold worth $2,700. When the ledge was struck in the lower tunnel, a man who was at work there was sent off some little distance on a message. During his absence his employer took out $10,000. It is a common thing to find from $200 to $300 in a single pan of dirt. The ledge is nearly fifty feet wide, all of which is good milling ore. The extremely rich vein is about three feet wide. This mine at Eagle Gulch is to-day the greatest mine in the State. To illustrate how fortunes are missed and made in mining, it may be stated that a short time ago a mine operator of great experience went and examined the property. It was offered to him for $75,000, and he refused it. Not long afterward that much could be taken out in little more than a week."

The Sierra Buttes, in Sierra County, has been worked nineteen years, and the net profits have reached over $100,000 annually.

The Plymouth Consolidated, of Amador County, reports as follows: —

Gold bullion produced by the mines of this company for 1884	$1,033,518.29
Operating expenses	331,163.84
Profit	702,354.45
Twelve monthly dividends, of $50,000 each, were paid, amounting to	600,000.00
Surplus over operating expenses and dividends	102,354.45
Add surplus on hand Jan. 1, 1884	44,559.96
Total surplus	$146,914.41

The mines at Forest Hill, in Placer County, yielded from 1859 to 1867, as follows: The Dardanelles, $2,000,000; the Jenny Lind, $1,100,000; the New Jersey, $850,000; the Independence, $450,000; the Deidesheimer, $650,000; five other mines, $250,000 each; and the Alabama, $150,000. These mines are worked still, some of them continuing the average yield, especially the Dardanelles.

The most expensive placer mining field in Nevada County was examined by Professor Silliman and M. Laur, a French engineer of mines, and both agreed as to the vast amount of wealth deposited therein. M. Laur said that if $12,000,000 were extracted annually from the region, it would take five hundred and twenty-four years to exhaust it within a single mile. At the base of Sugar Loaf, there were taken out *eight million dollars* ($8,000,000) previous to 1867.

The Grass Valley district, in Nevada County, to which we have already referred as yielding largely in 1883 and 1884, was even more prolific in its early history. Professor Silliman reported in March, 1865, that the gold product to that time amounted to *twenty-three million dollars* ($23,000,000). The Eureka paid $50,000 per month for several years, and is still a paying mine. The Gold Hill paid $4,000,000 in fourteen years; and the Massachusetts Hill, $3,000,000 in ten years.

The following extract from a late report of the director of the mint at Washington shows remarkable production: —

"The shipment of gold from Bodie district, Mono County, amounted for the year 1884 to over a million dollars, the output of each mine and locality in and about that district being given below: —

Standard Consolidated	$305,274.03
Bodie Consolidated	617,939.49
Syndicate	171,049.56
New Standard	17,714.76
Bodie Tunnel	2,075.90
Wagner's Tailings, mill	17,600.00
Virginia Creek Hydraulic Company	21,300.00
Scattering	8,630.00
Bodie Ore, dump pile	714.00
Total	$1,162,297.74

"The total value of bullion, mostly gold, sent from Bodie district up to the year 1886, amounted to about $17,000,000.

"Following is the record of the two leading mines of the district: —

Total output of the Standard Consolidated to Dec. 31, 1884.

1877	$784,522.80
1878	1,025,383.35
1879	1,448,835.47
1880	1,858,763.46
1881	2,131,458.87
1882	1,258,056.80
1883	1,155,181.83
1884	304,294.76
Total	$9,966,507.29

Total output of Bodie Consolidated Mine to Dec. 31, 1884.

1878	$1,042,236.80
1879	764,067.12
1880	429,817.80
1881	366,105.14
1882	484,890.48
1883	246,820.10
1884	617,310.18
Total	$3,951,247.62

Table showing shares, capital, and aggregate dividends of ten most valuable mines in California, Jan. 1, 1885, with time last dividend was paid: —

NAME OF MINE.	SHARES.	CAPITAL.	DIVIDEND.	LAST DIVIDEND PAID.
Black Bear, etc.	100,000	$3,000,000	$887,000	Dec. 28, 1884
Bodie Consolidated, etc.	100,000	10,000,000	1,607,500	Dec. 5, 1884
Excelsior, etc.	100,000	10,000,000	875,000	Oct. 6, 1880
Idaho Mining Company	3,100	310,000	3,620,800	Dec. 15, 1884
Plymouth Consolidated, etc.	100,000	5,000,000	950,000	Dec. 5, 1884
Plumas Eureka, etc.	40,625	406,200	1,741,223	Oct. 10, 1884
Sierra Buttes, etc.	22,500	225,000	1,375,352	Oct. 10, 1884
Standard Consolidated, etc.	100,000	10,000,000	4,450,000	Mar. 12, 1884
North Bloomfield, etc.	45,000	4,500,000	225,000	Nov. 5, 1880
New York Hill Gold, etc.	50,000	5,000,000	215,000	Aug. 10, 1882

NUGGETS.

The term "nugget" is applied to a mass or lump of gold of unusual size and weight. Nuggets are found more or less in all gold-fields. The largest ones have been found in the gold-fields of Vic-

toria, Australia. The so-called Welcome nugget, weighing over 182 troy pounds, was found at Bakery Hill, Ballarat, in 1858. Another — the "Blanche Barkley nugget" — weighed 146 pounds, and only six ounces was rock. The largest California nugget was found at Carson Hill, in Calaveras County, and weighed 108 pounds, four pounds of it being quartz. Speaking of "bars and nuggets," a writer says: —

"The first piece of gold found in California was worth fifty cents, and the second $5. Since that time one nugget has been found worth $43,000; two, $21,000; one, $10,000; two, $8,000; one, $6,500; four, $5,000; twelve, worth from $3,000 to $4,000, and eighteen, worth from $1,000 to $2,000 have been found and recorded in the history of the State. In addition to the above, numberless nuggets worth from $100 to $500 are mentioned in the annals of California gold mining during the last thirty years. From the date of the discovery of gold in California to the present time, the yield has been about $1,200,000,000, therefore it is very easy to see the small figure that nuggets cut in the gold yield. Big nuggets are very fine things to show, but after all it is the fine gold — the dust — that shows up. Although ten years younger than California, and a producer of a less precious metal, Nevada has yielded in good solid silver bars nearly $300,000,000.

The director of the mint at Washington furnishes the following table, showing the weight and value of the principal California nuggets, together with the locality where, and the time when found: —

DATE.	LOCALITY.	WEIGHT.	VALUE APPROXIMATELY.
	Calaveras County.	*Ounces.*	
1854	Carson Hill, near Angel's Camp quartz vein, 195 lbs., 4 lbs. quartz	2,340	$43,534.00
1854	Camp Seco, Stone Cabin Gulch. Frank Russworm	93	1,760.00
...	Mokelumne River. Said to weigh from 20 to 25 lbs.	...	...
	Placer County.		
1864	Michigan Bluffs, two miles distant on the American River	226	4,204.00
1876	Polar Star Claim, Dutch Flat, from a white quartz bowlder	...	5,760.00
	Sierra County		
1855	French Ravine	532	10,000.00
1851	French Ravine	426	8,000.00

DATE.	LOCALITY.	WEIGHT.	VALUE APPROXIMATELY.
	Sierra County—Continued.	*Ounces.*	
1850	French Ravine	263	$4,893.00
1860	French Ravine	93	1,757.00
1864	Smith's Flat	140	2,605.00
1869	Little Grizzly	107	2,000.00
...	Hope Claim	94	1,770.00
1866	Smith's Flat	146	2,716.00
1860	Monumental Quartz, Sierra Buttes (W. A. Farrish)	1,596	17,655.00
1854 }	Live Yankee Claim, Forest City, twelve nuggets, from	30	...
1862 }	30 to 170 ounces	170	...
1861	Smith's Flat	80	1,509.00
...	Oregon Claim, Forest City, nuggets, from 30 to 100	30	...
	ounces	100	...
...	Minnesota	266	5,000.00
	Butte County.		
...	Willard Claim, west branch of the Feather; weight 54 lbs. before melting, and 49 lbs. after melting	...	...
1862	West branch Feather, near Magalia. (Morrison)	...	1,607.00
1865	West branch Feather, near Magalia	...	1,760.00
	Shasta County.		
...	Banghart Mine, Mad Mule Cañon, crystalline. (Cooper)	13	248.00
	Nevada County.		
1855	Remington Hill, estimated to weigh	186	3,500.00
1867	Remington Hill	128	2,400.00
1865	Lowell Hill	58	1,100.00
	Siskiyou County.		
...	De Groots, Terry, and Klamath rivers	131	2,437.00
	El Dorado County.		
1849	Illinois Cañon, near Georgetown	...	1,000.00
1850	Georgia Slide, Hudson's Gulch	...	1,000.00
1850	Oregon Cañon, supposed to be the Fay nugget	...	1,250.00
...	Kelsey, or near it; date not stated	...	4,700.00
1857	Manhattan Creek, near Georgetown	...	...
1857	Garden Valley. Found by Samuel Treeworgee	...	525.00
1865	Spanish Dry Diggings. Grit Claim, dendritic gold (Fricot's specimen)	101.40	3,500.00
1867	Pilot Hill. Bowlder of gold quartz	426	8,000.00

DATE.	LOCALITY.	WEIGHT.	VALUE APPROXIMATELY.
	El Dorado County—Continued.	*Ounces.*	
1860	Spanish Dry Diggings, Pennsylvania Seam, 2½ lbs. .	36	$5,000.00
1854	Spanish Dry Diggings, near the Grit Seam. (Texas & Jacobs)	...	1,100.00
	Tuolumne County.		
1848	Wood's Creek, below Sonora	900	...
...	Knapp's Ranch, east of Columbia. A slab-shaped mass, 14″ x 9″ x 5″, which, with other fragments . .	396+	8,500.00
1849	Sullivan's Creek, 28 lbs.	408	7,590.00
1849	Gold Hill, near Columbia	360	6,500.00
...	Spring Gulch, near Columbia. (Globular form) . .	...	5,000.00
1850	Holden's Garden, Sonora. A mass of quartz and gold	...	30,000.00
1853	Columbia	283	5,265.00

One of the largest and finest gold nuggets ever unearthed in California was on exhibition in San Francisco in 1886. It is about the size of an ordinary Derby hat, weighs thirty-five pounds, and is worth about six thousand dollars. Great "gobs" of gold hang out of its sides.

ARIZONA.

More than two hundred years ago the Spaniards worked the mines in what is now the territory of Arizona, and carried away millions and millions of dollars. Baron Humboldt, and others, say that "masses of virgin silver, weighing from twenty to as high as two hundred and eighty-four pounds" were sent to the Spanish Crown for tribute. Cozzens, in his "Three years in Arizona, etc.," says:—

"If the reader is sufficiently curious to visit the old Custom House at Guaymas, in Sonora, these statements can be substantiated by reference to the records found there. Among the archives therein contained is rather a remarkable one, establishing the fact that, in 1683, the king's attorney brought suit to recover from the proprietor of the Real del Carmen mine, one Don Roderigo Gandera, a mass of virgin silver, taken by him from his mine, weighing *twenty-eight hundred pounds*, which the officer claimed as belonging to the king because it was a curiosity; and all curiosities taken from the soil, of whatever kind or nature, belong to His Most Gracious Majesty."

This is the largest nugget the world ever recorded. The king who brought action to recover it named the country in which it was found Arizuma, which means *silver-bearing*. From this was derived its present name.

There is no question about the great wealth of the Arizona mines; and the chief reason why they have not been worked more extensively is because the cruel and barbarous Apaches massacred the parties making the attempt. The mines are located in the western and northern part of the territory, just where the Apaches can conveniently raid them. As an example, the Patagonia mine was worked by Spaniards in 1760; in 1820 the Apaches massacred every miner who did not flee, and the mine was not only abandoned, but forgotten. In 1856 it was rediscovered, a company organized, smelting-houses, reduction works, dwellings, and storehouses erected, and a marvellously lucrative business inaugurated. But when the company was making an actual daily profit of *from twelve to fifteen hundred dollars*, the Apaches stole all the stock of the company, murdered the superintendent and many of the miners, and put a speedy end to further business in that mine. From that day the mine has not been worked, and the buildings and machinery have gone to decay. While there is less peril to miners in that country to-day, it is still true that the Apaches are a terror to the country, and doubtless will continue to be until the United States government becomes strong enough and wise enough to control them.

True, the isolation of the country, being without a port of entry, and more than a thousand miles from the nearest supply-point, at the time of the last raid of the Apaches on the Patagonia mine, was a great hindrance to successful mining. A steam-engine for the mine was drawn by mules from Lavacca, Tex., fourteen hundred miles; also a boiler weighing six thousand pounds. Now, of course, since the Territory has been penetrated by railroads, this isolation is a thing of the past; but the savages continue to be a menace to the mining population.

E. J. Farmer says, in his "Resources of the Rocky Mountains," issued in 1883: —

"The mineral resources of Arizona, like those of the entire region of the Rockies, are only just beginning to be known; and yet the production of the Territory, in gold, silver, copper, and lead, for 1882, was $11,700,000, giving Arizona the fourth place in the list. As the Territory is full of mountains, so do the mountains seem to be full of mineral; and gold, silver, copper, lead, coal, and salt have been dis-

covered. Gold, here, is mostly found in veins of quartz; sometimes it is combined with iron and copper pyrites, while from placers in the beds of some streams, it is collected in a pure state. Silver is found here in nearly all its combinations; as carbonates, sulphurets, chlorides, bromides, silver-glance, and as pure metal. The proportion of rich galena ores, as compared with those of Colorado, is extremely small, yet of other silver combinations there are an abundance. The copper deposits of Arizona are probably the finest on the continent, the Lake Superior region not excepted. Mining may be said to have recommenced in this portion of New Spain in 1860; for the precious metals have been known to exist here for more than two hundred years, and were mined at that time by the Spaniards."

From the same authority we learn that the famous Tombstone district was yielding, when he wrote, *five hundred thousand dollars* ($500,000) monthly. There are more than twenty famous mines in this district, which extends five miles from north to south, and eight from east to west; each one capitalized for from two to ten million dollars.

The output of the Contention Consolidated for 1882 was *one million eight hundred fourteen thousand dollars* ($1,814,000).

The output of the Grand Central, for the same time, was *one million three hundred fifty-eight thousand dollars* ($1,358,000). And that of the Tombstone Gold and Silver Mining Company was *one million four hundred forty thousand dollars* ($1,440,000).

The Silver King rewards its owners with a large output, *seven hundred forty-one thousand* ($741,000) in 1882. The McCracken lode has yielded over *eight hundred thousand dollars* ($800,000); the Hackberry and McMorris nearly *half a million* each.

In Yuma County gold was discovered in placers, in 1862, and *one million five hundred thousand dollars* ($1,500,000) were taken out in three years. The mines of the Castle-Donee district have yielded more than *two million dollars* ($2,000,000).

The Vulture mine, in Mariposa County, has yielded more money than any mine in Arizona Territory — *three million dollars* ($3,000,000).

Arizona contains much copper. The Copper Queen mine had yielded over *two million dollars* ($2,000,000) up to Jan. 1, 1883. The territory is called the "Copper Queen of the Rockies." The gold and silver product of Arizona for year ending June 30, 1891, was $2,839,393.

In confirmation of much that has been said about Arizona, the following table shows shares, capital, aggregate dividends, of five of

the most valuable mines in that territory Jan. 1, 1885, with time last dividend was paid: —

NAME OF MINE.	SHARES.	CAPITAL.	DIVIDENDS.	LAST DIVIDEND PAID.
Grand Central, etc.	100,000	$10,000,000	$800,000	Dec., 1882
Silver King, etc.	100,000	10,000,000	1,350,000	Dec. 15, 1884
Tombstone Mill, etc.	500,000	12,500,000	1,250,000	April 12, 1882
Contention Mining Company	250,000	12,500,000	1,187,500	Dec. 24, 1884
Vizini Consolidated, etc. . . .	200,000	5,000,000	145,000	Nov., 1884

DAKOTA.

While Dakota is known the world over for her great farms, her mines are no less famous. The rich gulches of Whitewood and Deadwood creeks became known in 1875, and in two years *four million dollars* ($4,000,000) in gold were taken out.

The Homestate produced *one million one hundred fourteen thousand five hundred sixty-eight dollars* ($1,114,568) in 1882, *one million one hundred seventy thousand nine hundred and nineteen dollars* ($1,170,919) in 1883, and *one million two hundred fifty-two thousand seven hundred sixty-five dollars and seventy cents* ($1,252,765.70) in 1884; the Father De Smet, *three hundred ninety-one thousand two hundred sixty-nine dollars* ($391,269), *three hundred fifty-five thousand four hundred twenty-three dollars and sixty-one cents* ($355,423.61), and *four hundred seventy-four thousand five hundred fifty-two dollars ninety-four cents* ($474,552.94), in the same years respectively; and the Deadwood Terra, *five hundred fifty-one thousand fifty-two dollars* ($551,052), *two hundred forty-five thousand six hundred and fifty dollars* ($245,650), and *four hundred sixty-six thousand five hundred thirty-two dollars and seventy-eight cents* ($466,532.78).

The production of gold in the Black Hills of Dakota from 1876 to Aug. 1, 1882, amounted to *twenty-two million dollars* ($22,000,000); and the average annual yield since has been about five million dollars ($5,000,000).

The Highland mine produced *five hundred eleven thousand seven hundred forty dollars and thirty-two cents* ($511,740.32) in 1884.

The director of the mint at Washington estimated the gold and silver yield of Dakota in 1889 (his last report) at *two million nine hundred sixty-four thousand six hundred forty-six dollars* ($2,964,646).

IDAHO.

The Vishnu and Elmore mines have yielded more than *two million dollars* ($2,000,000).

At Gold Hill a single mill has run twelve years and produced *two million six hundred fifty thousand dollars* ($2,650,000).

The placers in Stanley Basin, Custer County, were discovered in 1862, and yielded, in ten years, *five hundred thousand dollars.* Since then a few men only have worked them, taking out *one hundred thousand* more. In the early days of the mine, one man, with a "rocker," took out *nine hundred dollars* in one day. Loon Creek produced *six hundred thousand dollars* in three years.

A twenty-stamp, dry-crushing mill was erected in Yankee Fork District in 1880, since which time it has turned out *three million dollars* ($3,000,000).

Custer County has added *one million three hundred fifty thousand dollars* ($1,350,000) to the wealth of the world in gold from its placers, and from its quartz mines *six million eight hundred thousand dollars* ($6,800,000).

Semhi County, since 1867, has yielded *eight million seven hundred thousand dollars* ($8,700,000). Its yield in 1885 was *six hundred thousand dollars*, and, with more capital and proper reduction machinery, that amount might have been easily trebled.

The Poorman mine, in Ouzhee County, received in return *ninety thousand dollars* ($90,000) for its first shipment of one hundred tons of ore. Soon after, fifteen tons, shipped to Newark, N. J., yielded *seventy-five thousand dollars* ($75,000). Its yield produced some of the richest specimens of ruby and native silver ever mined. A specimen of this ruby, about two feet square and sixty per cent pure silver, received a special gold medal at the Paris Exposition.

The Morning Star has produced *one million dollars*) ($1,000,000), one lot of one hundred tons yielding *one thousand dollars* per ton.

The Elmore, with a twenty-stamp mill, yielded *six hundred thousand dollars* ($600,000) in a thirty days' run.

E. J. Farmer shows the great wealth of Idaho's mines by the following table:—

Oro Fino Mine	has produced	$2,756,128
Old Elmore Mine	"	2,000,000
Golden Chariot and Minnesota	"	3,000,000
Mahogany Mine	"	1,200,000
Poorman Mine	"	4,000,000

Morning Star Mine	has produced	$1,000,000
Monarch Mine	"	1,100,000
Buffalo Mine	"	1,000,000
Ada Elmore Mine	"	1,200,000
Confederate Star Mine	"	350,000
Vishnu Mine	"	850,000
Wild West Mine	"	300,000
Red Warrior, Elk Creek, Feathery River, and Bear Creek Placers	"	2,000,000
Custer, Dickens, Montana, etc.	"	1,250,000
Mt. Estes Mines	"	2,000,000
Ramshorn	"	600,000

And he adds: "The mines whose product is from $10,000 to $50,000 per annum can be counted by scores, many of which will doubtless in time prove bonanzas. Sufficient development has been made to demonstrate the fact that Idaho has rich veins of the precious metals, and that when her resources shall become known to the world, she will have a brilliant future. There are yet thousands of square miles of her metal-ribbed mountains that have never been trodden by a white man's foot, and where prospecting will be carried on for years to come, with success."

The following table shows the estimated production of the precious metals in Idaho since first discovery: —

Year.	Amount Produced.	Year.	Amount Produced.
1862	$5,000,000.00	1874	$3,100,447.69
1863	7,448,400.91	1875	1,983,720.27
1864	9,019,704.30	1876	2,267,013.36
1865	12,914,364.25	1877	3,474,787.69
1866	10,001,850.44	1878	2,657,216.91
1867	7,388,064.31	1879	2,553,634.58
1868	3,030,213.56	1880	1,634,637.19
1869	1,613,453.68	1881	4,915,100.00
1870	2,239,190.61	1882	5,500,000.00
1871	2,219,937.94	1833	5,000,000.00
1872	2,675,192.00	1884 (estimated)	6,500,000.00
1873	3,653,605.15	1885–90	36,000,000.00
		Total production	$142,790,530.14

Here is a Territory, so isolated and subject to the depredations of savage tribes, until within five or six years, as to interfere with mining and all other industries, adding nearly *one hundred and fifty million dollars* to the world's wealth.

From the Montana mine four men took out *eighty thousand dollars* ($80,000) in six months.

The Mayflower produced *two hundred thousand dollars* ($200,000) in 1881, and *five hundred thousand dollars* ($500,000) in 1882. It

was sold to J. V. Farwell at the beginning of 1882 for *three hundred and seventy-five thousand dollars* ($375,000).

The Idahoan produced *three hundred thousand dollars* ($300,000) in 1882, and the Jay Gould *two hundred thousand dollars* ($200,000).

The Ramshorn was discovered in 1877, since which time it has yielded *two million dollars* ($2,000,000). In 1882 its yield was over *three hundred thousand dollars* ($300,000).

From the West Fork mine one man took out *fifty thousand dollars* in twenty days.

The Bullion mine yielded *one hundred twenty-five thousand* in 1883; from Nov. 1 to Dec. 10 of that year the yield was *seventy-two thousand nine hundred sixty dollars* ($72,960); this in *forty days*. The whole Bullion *district* yielded *seven hundred thousand dollars* ($700,000) in 1882, and *one million dollars* in 1883.

The stock capital of the Idahoan mines is *ten million dollars*.

The Minnie Moore was sold for *one million dollars*.

One mine in Warm Spring Creek yields *three hundred thousand dollars* ($300,000) annually. Three others yielded *one million two hundred thousand dollars* ($1,200,000) in a single season.

MONTANA.

Although Montana is so remote and isolated, the Territory ranks next to the State of California in the production of gold. The discovery of rich placer mines in 1862 caused a rush to that country, and within three years from the time miners were fairly settled down to work, Alder Gulch alone, thirteen miles long, yielded *sixty million dollars* ($60,000,000).

Since gold mining commenced in Montana, the Territory has produced, including copper and lead, *three hundred million dollars* ($300,000,000).

The gold output for 1884 amounted to $2,170,150.00. The silver output for 1884 amounted to $8,138,350.00; total, $10,308,500.00.

Four large companies to prosecute mining were organized in Lewis and Clarke County in 1884, and others have been added from month to month since: the Bald Mountain Mining Company, with capital of *two million five hundred thousand dollars* ($2,500,000); the Clany Creek Mining Company, with capital of *two million five hundred thousand dollars* ($2,500,000); the Crown Point Mining Company, with capital of *two million five hundred thousand dollars*

($2,500,000); and the National Mining Company, with capital of *five hundred thousand dollars* ($500,000).

The Hecla Company produced *six hundred nincty-two thousand eight hundred twenty-three dollars and nine cents* ($692,823.09) in gold and silver, in 1884; and, in addition, nearly five million pounds of lead, and more than a third of a million pounds of copper.

The Penobscot has produced *one and a half million dollars* since it was opened.

The Drum Lummon carries a vein of gold and silver ninety feet wide, the ore averaging fifty dollars per ton. In 1883 this mine was sold to an English company for *one million six hundred thirty thousand dollars* ($1,630,000). Two years ago it was claimed that this mine had $9,000,000 in sight.

The output of the Whitelash Union has amounted to about *four million dollars* to this date.

Last Chance Gulch, with its tributaries, has yielded *sixteen million dollars* ($16,000,000).

The Butte City region produces about *six million dollars* per annum, including copper. The Alice is found here, which paid dividends amounting to *five hundred thousand dollars* in five years. In 1884 the whole property of the company yielded *one million two hundred thousand dollars* ($1,200,000).

The Lexington is a high-grade silver mine, and was sold to a French company in 1881 for *one million five hundred thousand dollars.* In 1884 its output was *one million two hundred eighty-nine thousand six hundred eighty-five dollars and thirty-four cents* ($1,289,685.34). Its monthly yield when the Washington mint director reported last was nearly *one hundred thousand dollars.*

The Algonquin yields *one hundred and fifty thousand dollars* per annum.

The Alta and the Comet mines together produced *three hundred forty-three thousand four hundred forty-eight dollars* ($343,448) in a single year, over and above all expenses.

The mines of the Helena Company yielded *one million one hundred thousand dollars* ($1,100,000) in 1884.

The Alice has produced $100,000 per month; the Gloster, $50,000 per month; the Cable has yielded $1,000,000, and has $1,500,000 in sight.

The Elkhorn produced in ten months, ending Dec. 31, 1884, *one hundred seventy thousand six hundred ninety-six dollars.*

The Valdemere, which began work in 1883, paid *five hundred fifty*

RED MOUNTAIN.

thousand dollars in dividends in eighteen months, and has continued to pay at this rate.

The Moulton is capitalized at *two million dollars* ($2,000,000), and yielded, in 1883, *three hundred seventy-six thousand six hundred eighty-four dollars and twenty cents* ($376,684.20); and in 1884 its output was over *seven hundred thousand dollars.*

The Bell mine yielded *four hundred fifty thousand dollars* in 1884.

The illustration of Red Mountain exhibits one of the most important undeveloped mining regions of the United States. A writer says:—

"This mineral field covers an area of about twelve miles square, and contains vast deposits of gold, silver, copper, lead, and tin. The district was discovered about twenty years ago, and there are now nearly three hundred mineral locations, and it may be truthfully said that it is the most important undeveloped mineral field in Montana, or even in the United States."

Of course the scenery is surpassingly grand. The editor of the *Montana Stock and Mining Journal* says:—

"In point of scenic beauty, Red Mountain and its surroundings probably excel that of any camp in Montana. The beautiful Beaver Creek leaping from its dizzy height, through its narrow, rocky defile, to a commingling with the waters of the Ten-mile, at the very foot of Red Mountain, presents a study worthy of the pencil of the greatest artist the world can produce. Switzerland, under treatment of the most enthusiastic writer, cannot furnish a more beautiful picture, and the entire cañon of the Ten-mile, from the Hot Springs, near Helena, to the source of the stream at Red Mountain, is one grand kaleidoscope of ever-changing grandeur, baffling the power of pen to describe. A good and natural wagon road leads from Helena to the mines, through the cañon, unfolding its great beauties at each turn, in an atmosphere laden with the perfume of countless thousands of blossoming flowers, as one might turn the pages of an intensely interesting book inspired by some favorite author."

Immense deposits of coal, iron, copper, and lead are found in the Territory. Professor Raymond says:—

"The almost uniform experience of working Montana copper veins has been to demonstrate that the veins improve in width and richness the deeper the shafts are sunk. At a depth of from eighty to one hundred feet, several of them show ore that will average fifty per cent copper, though near the surface the same openings yielded ore

carrying but twenty-five to thirty-three per cent. The lodes of copper are abundant, and the veins from four to one hundred feet in width."

E. J. Farmer says: "Precious stones, as agates, garnets, rubies, amethyst, and jasper, are found in many localities. A ledge of amethyst eighteen inches wide has recently been discovered on Running Wolf Creek, and a mountain of jasper, near Belmont Park. Ledges of fine white marble and sandstone of superior quality have been found in Madison County."

Montana claims to have the four greatest mines in the world, — the Anaconda, Bluebird, Granite Mountain, and Drum Lummon. Their combined product for 1886 was nearly $9,000,000. The gold and silver product of Montana was $22,893,939 for the year ending June 30, 1890.

NEVADA.

The fame of Nevada is world-wide on account of the Comstock lode, which once yielded almost fabulous wealth.

The Eureka Mining Company produced, in 1884, *four hundred eighty-four thousand four hundred twenty dollars and ninety-four cents* ($484,420.94).

The Manhattan Silver Mining Company have operated their mill for ten months during the year, producing from their mines 5,204 tons of bullion, averaging $231.50 per ton, which was shipped to London, and yielded $1,128,909.91. The mines of this company have been worked continuously for the past twenty-five years, and are estimated to have produced over $25,000,000.

The output of the Yellow Jacket mine, in 1884, was: gold, $294,798.94; silver, $489,853.66; total, *seven hundred fourteen thousand six hundred fifty-two dollars and sixty cents* ($714,652.60).

The gold and silver product of Nevada was $9,206,060 for the year ending June 30, 1890.

COMSTOCK LODE,

Showing shares, capital, aggregate dividends, and when last dividend was paid. The reader will see that the dividends ceased with most of them, several years ago.

NAME OF MINE.	SHARES.	CAPITAL.	DIVIDENDS.	LAST DIVIDEND.
Belcher Silver Mining Co. . .	104,000	$10,400,000	$15,397,200	April 10, 1876
Chollar Mining Co.	112,000	11,200,000	3,080,000	Feb. 10, 1872
Confidence Mining Co.	24,960	2,496,000	78,000	May 1, 1865
Crown and Point, etc.	100,000	10,000,000	11,688,000	Jan. 12, 1875
Gould & Curry, etc.	108,000	10,800,000	3,825,800	Oct. 20, 1870
Hale & Norcross, etc.	112,000	11,200,000	1,598,000	April 10, 1871
Kentuck Mining Co.	30,000	3,000,000	1,300,000	Aug. 20, 1884
Ophir Mining Co.	100,800	10,000,800	1,596,400	Jan. 17, 1880
Savage Gold and Silver, etc. .	112,000	11,200,000	4,560,000	June 11, 1869
Sierra Nevada, etc.	100,000	10,000,000	102,500	Jan. 16, 1871
Succor Mill, etc.	68,400	6,840,000	22,800	Oct. 16, 1871
Yellow Jacket, etc.	120,000	12,000,000	2,184,000	Aug. 10, 1871
Total dividends, $45,432,700.				

The whole output of the above mines was nearly double the dividends, the expenses amounting to about *forty millions.* The *forty-five million four hundred thirty-two thousand seven hundred dollars* ($45,432,700) went into the pockets of stockholders as dividends.

From a report of the Mechanics' Institute of San Francisco, in 1867, we extract the following upon the yield of bullion by the Comstock lode: —

"The annual product for the last five years has been in round numbers as follows: —

1862	$4,000,000
1863	12,000,000
1864	16,000,000
1865	15,000,000
1866	16,000,000
Total product in five years	$63,000,000

"The total annual production of silver in the world in 1854 is stated by Professor Whitney at $47,443,200. The bullion obtained from the Comstock lode in 1866 is, therefore, more than one-third greater in value than all the silver product of the world in 1854. Mexico, in its most flourishing days, from 1795 to 1810, produced an annual average of $24,000,000 from several thousand mines. After 1810, when the revolution took place, the yield of the mines fell in some years to as low a figure as $4,500,000, but the average from 1810

to 1825 shows $10,000,000. At the present time the entire product of Mexico does not exceed that of the Comstock lode.

"The celebrated mines of Potosi averaged about $4,000,000 per annum for three hundred years; those of the Veta Madre (mother vein) of Guanajuato about $3,000,000 for an equal period; and the mines of the Real del Monte Company, on the Biscanya vein in Mexico, over $400,000 for the last one hundred and ten years, or a total of $44,000,000, a less amount than has been obtained from the Comstock lode in the last three years."

The dividends of ten mines on Comstock lode for the second quarter of 1867 were as follows: —

COMPANY.	APRIL.	MAY.	JUNE.	TOTAL.
Savage	$80,000	$120,000	$160,000	$360,000
Hale & Norcross	50,000	50,000	50,000	150,000
Imperial	60,000	60,000	40,000	160,000
Yellow Jacket	...	60,000	90,000	150,000
Chollar Potosi	...	70,000	70,000	140,000
Kentuck	...	40,000	60,000	100,000
Crown Point	48,000	48,000	...	96,000
Gold Hill, etc.	5,000	5,000	5,000	15,000
Empire Mill, etc.	...	7,000	...	7,200
Gould & Curry	...	...	...	...
Total	...	...	...	$1,178,200

The production of nine mines of Nevada to March, 1882, were as follows: —

Belcher	$15,397,000
California Gold and Silver Mining Company	31,510,000
Consolidated Virginia, etc.	42,930,000
Crown Point, etc.	11,588,000
Eureka Consolidated, etc.	4,705,000
Gould & Curry	3,826,000
Northern Bell, etc.	2,162,500
Richmond Consolidated, etc.	3,742,550
Savage	7,460,000
Total	$123,321,050

A company proposes to dredge the Carson River in Nevada for quicksilver and amalgam. Eighteen miles of river bed have been selected. It is estimated that ten per cent of the bullion product of

the Comstock mines has flowed as tailings into the Carson River, and that at least $40,000,000 will be recovered.

Production of Shorey County, in which the Comstock lode is situated, in 1866: —

January	$816,430.43	August	$1,420,902.35
February	971,643.46	September	1,169,391.46
March	1,061,577.65	October	1,409,220.00
April	1,052,759.89	November	1,327,985.00
May	1,145,293.41	December	1,348,828.80
June	1,244,297.54		
July	1,198,741.56	Total	$14,167,071.55

In United States currency this represents a value of $18,072,934.

Production of Shorey County first six months of 1867: —

January	$1,330,832.80	April	$1,567,427.60
February	1,238,811.63	May	1,784,724.25
March	979,786.78	June	1,594,794.22

Total	$8,501,377.28
July	1,613,559.75
Total	$10,114,937.03

NEW MEXICO.

Little attention, comparatively, had been given to mining in the Territory of New Mexico. Other fields have been more inviting to miners than this; and yet there is no question that gold-seekers in the future will find this to be a high paying locality, if not a bonanza. G. S. Haskell, Esq., was the commissioner of New Mexico to the Denver Exposition, and from his report of the Territory's display there we extract the following: —

"The Lake Valley district made a showing which far surpassed anything else in the building in the way of rich ores coming from large bodies. The verdict was universal and unequivocal. They were inclosed in three glass cases. In one was a piece of horn silver weighing 640 pounds valued at $7,240. A ton of this ore is worth $22,625.69. Eight men in eight hours took out $130,000 worth of it. One brick of 241 pounds, value $2,169.14, 990 fine, was shown, which was run from 241 pounds of the ore. This ore is all from the mines of the Sierra Grande company. The output at present is at the rate of about $5,000,000 per annum.

"Percha district, where the recent new discovery was made, was represented by one piece of ore weighing 150 pounds, value $1,800,

taken from the Solitaire claim, bonded by H. A. W. Tabor for $100,000. It is a sulphide of silver and native silver, running sixty-nine per cent in the pure metal. This is probably the largest piece of sulphide of silver ever discovered. A smaller piece of equal richness was exhibited, in which the grass roots were seen.

"The Organ district was represented by about thirty mines, of which we can mention only a few. Copper Duke, eight feet wide, discovered in September, nine feet of development, runs forty to sixty per cent in copper and as high as $150,000 gold. This was one of the most remarkable free gold specimens shown."

LAKE VALLEY SMELTING WORKS.

From Ritch's "Illustrated New Mexico" we extract the following: —

"There is, however, one young giant among the mining camps which has so wonderfully and so recently come into existence, and the fact with reference to which, read so much like a chapter from the 'Arabian Night's Entertainments,' that we here transfer an extract from a paper prepared by an able pen, and in which statement the writer hereof, who has personally visited and examined the camp in question, is prepared to verify.

"'There are at Daly (now Lake Valley) not less than 7,000 tons of ore on the dumps, running from $100 to $20,000 to the ton; and

in the mines, already uncovered and exposed to view, there are certainly not less than 20,000 tons more of the same kind and richer ore. We believe we saw, in the two hours it took us to view the mines, not less than $15,000,000 worth of ore. That running from $200 to $300 to the ton is classed as low grade in this camp. The pay begins at the grass roots and even in places at the croppings above the ground, and continues to a depth already reached, of fifty feet, and along the hillside for a distance of probably 2,000 feet. The deepest shaft we descended was not over fifty feet, and the ore body was still pitching downward. Huge caverns have been excavated beneath the grass, with only a thin roof of limestone or porphyry, from one to six or eight feet thick supported on timbers, which gives the place a wild, weird appearance, with its huge mountains of silver ore rolled one upon another by Nature in her throes with some primeval volcano, and prepares one for the appearance, in some dark corner, of the genius who presides over Nature's treasures. Instinctively one raises his candle to get a better view of the magic chambers. Here the rock is black, and looks like iron slag from some huge forge; there it has a reddish cast, as though the internal fires to which it owes its origin had not yet cooled off; yonder the ore loses its characteristics as a rock formation and resembles a huge mass of soft quicksilver amalgam, both to the touch and to the eye; in another spot it hangs in beautiful, glistening, soft chloride crystals which feel damp in the hand, and when compressed yield to the pressure and assume the shape of the closed palm, like dough. The latter formation is more readily smelted than any ore we ever saw before, the flame of the candle sending the virgin silver dripping down the wall like shot. We had heard and doubted this story and were perfectly well aware of the fact that, according to the chemistry, it requires 1,873 degrees Fahrenheit to fuse silver; yet we are now living witnesses to the fact that the flame of the candle held against the projecting crystals of chloride of silver in these mines, unaided by the blow-pipe, is sufficient to fuse them in half a minute. These chlorides run about $27,000 to the ton; and we certainly saw of them and horn silver (equally as rich) a hundred tons. The chamber containing these crystals is called the Bridal Chamber; and it is here that Governor Safford, of Arizona, offered to give $50,000 to be allowed to carry off and keep all the ore that he might by his own individual labor extract in ten hours. There is scarcely any waste rock. There are five piles of ore to one of waste; and it is with difficulty that rock is obtained for building the dumps to the height of a wagon without

using ore for the purpose.'" But for our reliable authority, the foregoing might seem a tale of fiction.

American occupation of New Mexico took place in 1846, from which time, according to the report of the director of the United States mint, to Jan. 1, 1882, the output of the Territory, in gold and silver, amounted to *thirteen million nine hundred and seventy-two thousand dollars* ($13,972,000). This does not include, of course, the discoveries since January, 1882, which embrace the remarkable disclosures of Lake Valley and other localities. The amount would be nearly doubled were the whole output to the present date included.

The Sierra Grand Mining Company paid *one million dollars* in dividends to the stockholders in 1883 and 1884.

The Merritt mine yielded about *one thousand dollars* ($1,000) per day the last part of 1884.

Of the Kohinoor of Sierra Apache, Mr. Ritch says:—

"There are at least two thousand tons of ore upon the dumps of these properties, all having been extracted from the drifts, cuts, and winzes (no stoping being done), and its estimated value, made from close samples and tests, is far in excess of the original purchase money, which is popularly supposed to have been $500,000. Numbers of leading mining experts have recently examined these properties, and it is stated that none of them have estimated the ore reserve to be seen at less than $5,000,000."

The output of Seventy-Six in twelve years has been *one million two hundred sixty thousand dollars* ($1,260,000).

The gold and silver product of New Mexico was $2,461,010 for the year ending June 10, 1890.

UTAH.

Although Utah is called "the Iron Queen of the Rockies" on account of its immense beds of iron ore, it ranks fifth among the States and Territories in the production of gold and silver.

The Eureka Hill Company's output in 1884 was *seven hundred thousand dollars* ($700,000), in round numbers.

The following companies paid dividends in 1884, as follows:—

Company.	No. of Dividend.	Amount.
Horn Silver	4	$1,200,000
Ontario	12	900,000
Eureka Hill	6	120,000
Honerine	1	12,500
Total		$2,232,500

The Horn Silver is capitalized at *ten million dollars* ($10,000,000). The following table shows the marvellous product from Feb. 17, 1879, to Jan. 1, 1885, — less than six years: —

107,770,587 pounds lead, sold in Chicago for	$4,580,778.26
6,148,906 ounces silver, sold in New York for	6,943,858.41
11,678½ ounces silver, sold in London for	12,654.12
2,585 ounces silver lost by railroad company, at $1.12	2,891.20
3,264,341 pounds base bullion, sold in Utah for	244,399.93
12,301,963 pounds ore, sold to other smelters for	194,123.66
Total gross yield of mine to the company	$11,978,705.58

The Flagstaff yielded, from 1871 to 1879, over *five million dollars* ($5,000,000), when the vein appeared to be exhausted. The company has recently been reorganized, with the "confident expectation that this lode will enter on a second producing stage from end to end."

In seven years, from Feb. 1, 1877, the Ontario Silver Mining Company realized *thirteen million five hundred thirty-nine thousand nine hundred eighty-one dollars and sixty-nine cents* ($13,539,981.69). More than *six million dollars* of it were profit. The mine is owned by a company in San Francisco, with capital stock of *fifteen million dollars* ($15,000,000).

The Antelope and Prince of Wales have yielded over *one million dollars* ($1,000,000).

It is estimated that the so-called American Fork district yielded, from 1874 to 1884, "500,000 tons of ore, equal to 100,000 tons of bullion, yielding $8,800,000 in silver, $1,500,000 in gold, and $5,000,000 in lead; amounting in all to $15,300,000."

The Eureka Hill mine yields $33,000 per month.

The Tecumseh, Stormy King, California, Maggie, and Silver Flat mines are worked by the Christy Company, with a capital of *six million dollars* ($6,000,000). Fifty thousand tons of ore yielded *one million three hundred thousand dollars* ($1,300,000).

The Silver Reef produced *four million dollars* ($4,000,000) in five years.

Mining commenced in Utah in 1870, since which time the Territory has added *one hundred and twenty million dollars* ($120,000,000).

Professor Newberry says of the iron ore deposits of Utah: —

"The deposits of iron ore near Iron City and Iron Springs, in Southwestern Utah, are probably not excelled in intrinsic value by any in the world. The ore is magnetic and hematite, and occurs in

a belt fifteen or twenty miles long, and three or four miles wide, along which there are frequent outcrops, each of which shows a length and breadth of several hundred feet of compact, massive ore of the richest quality. There are certainly no other such deposits of iron ore west of the Mississippi, and should it be found practicable to use Utah coal for the manufacture of pig and bar iron, and steel, from these ore beds, it would be difficult to overestimate the influence they would have on the industries of the Pacific coast."

Of the *twenty thousand square miles* of coal fields in the Territory, the Professor says: —

"Within fifteen miles of the iron ore beds, and separated from them by a nearly level plain, are deposits of coal which, I believe, can be successfully used for smelting iron, and which are certainly capable of furnishing a fuel that will perform all the other duties of coal, and that in inexhaustible quantities. These coal beds are connected with the coal fields of Eastern Utah, but it is only here that they push through the mountains into the 'railroad valleys,' which lie between the Wasatch and the Sierra Nevada. Several beds of coal here crop out on top of Cedar Mountain — beds which vary from five to eighteen feet in thickness. The coal is of cretaceous age, and equal in quality to any of the Western coals. It makes a fairly good coke, apparently as good as that manufactured at Trinidad, Colorado, and so extensively used for metallurgical purposes in that State. It is fully equal to the coals of Central and Northern Utah; hence it will probably furnish a fuel adapted for smelting and manufacturing iron."

Table showing shares, capital, and aggregate dividends of five of the most valuable mines of Utah, Jan. 1, 1885, with time last dividend was paid: —

NAME OF MINE.	SHARES.	CAPITAL.	DIVIDENDS.	LAST DIVIDEND.
Ontario Mining Company . .	150,000	$15,000,000	$26,050,000	Dec. 31, 1884
Horn Silver, etc.	1,400	400,000	4,000,000	Nov. 15, 1884
Stormont Silver, etc.	200,000	200,000	155,000	Nov. 1, 1881
Crescent Mining Company . .	600,000	. . .	150,000	Oct. 25, 1883
Christy Mining Company . .	60,000	6,000,000	90,000	Feb. 9, 1883

The gold and silver product of Utah was $9,550,505 for the year ending June 30, 1890.

WYOMING.

E. J. Farmer says of the "wonderful crystallizations" of this Territory : —

"At Rawlins, red oxide iron ore is pulverized for paint ; while at Cheyenne, there are carriage and wagon shops, as well as manufactories of jewelry from the precious stones which are found here in many localities. The Territory is a rich field for scientists, having wonderful petrifications, fossils, and rare crystallizations. The agates, opals, topaz, jasper, and chalcedony from Sweetwater County are exceedingly beautiful. The most magnificent crystallization at the Denver Exposition, in 1882, was a portion of a fossil tree from Uintah County. The bark seemed to have been agatized first, and after the softer parts of the wood had decayed, crystals formed on the inner surface for a depth of two inches, leaving a hollow tube eight inches in diameter and fifteen inches in length. These crystals sparkled like diamonds, and were the admiration of all beholders."

The gold and silver mining of Wyoming is of little account compared with that of Colorado, California, or Utah ; and yet it is carried on profitably in some portions of the Territory, and promises to become an important factor in the future development of the country.

Extensive mines of copper, as well as of coal, have been opened in the Territory, promising to add largely to its wealth in the near future. The editor of the Cheyenne *Leader* says of the Village Belle copper mine : —

"It is astonishing to see the large amount of native copper found in this mine. I picked up a number of specimens containing globules of pure copper, and last evening the miners brought to the store a bag full of specimens containing pure copper in large quantities, each globule varying in size from a pin-head to a buck-shot. The men had just gotten down to a pure copper streak late in the afternoon. Everybody in the camp and out of the camp is talking of the Village Belle, and if the claim were a veritable belle of the village, she would be flattered beyond measure by the praise bestowed upon her.

"Several openings have been made in the hill at different points, in all of which good copper ore is exposed, which leads to the conclusion that the whole hill is an immense bed of copper. The first vein or ore body struck was over twelve feet in sight. The ore is a variegated dark brown and green silicate, and runs from thirty-three and one-third to fifty per cent copper. The openings before reaching

the ledge are made through a deposit of red hematite iron. This magnificent property cannot be equalled in any copper camp."

And this is only one copper mine of many recently discovered!

Mr. Farmer says of the Wyoming coal fields: —

"They occupy a belt fifty to one hundred miles wide across the southern portion of the Territory, and are found in the region of the Big Horn and Powder rivers, east of the Wind River, and both east and west of the Laramie range. At Cooper Lake, in the Laramie Plains, a vein has been discovered which is fifteen feet thick, and one at Carbon ten feet. The veins vary in thickness from four to forty feet; while at Carter Station, on the Union Pacific Railway, in Uintah County, these coal seams are estimated to measure four hundred feet in thickness, with sandstone strata between them."

His description of the remarkable soda deposits in the Territory will be read with surprise as well as profit, as follows: —

"The soda deposits of Wyoming are certainly the most remarkable in the world. Twelve miles southwest of Laramie City there are a number of lakelets of solidified soda. The largest of these covers an area of fifty-six acres, and the deposits vary from ten to fifteen feet in thickness in the deeper portions. From these lakelets a cube of two hundred cubic feet, of solid crystalline sulphate of soda, was exhibited at the Centennial Exposition, which gave the following analysis: 'Soda, 19.4 per cent; sulphuric acid, 24.8 per cent, equal to 44.2 per cent of sulphate of soda; water of crystallization, 55.8 per cent.' Colonel Downey, of Wyoming, thus describes these lakelets: 'The deposit whence the sample mentioned was taken covers an area of more than one hundred acres; being a solid bed of crystallized sulphate of soda nine feet thick. The deposit is supplied from the bottom by springs, whose water holds the salts in solution. The water, rising to the surface, rapidly evaporates; and the salts with which it is impregnated readily crystallize in the form mentioned. Upon removing any of the material, the water, rising from the bottom, fills the excavation made; and the salts, crystallizing, replace in a few days the material removed. Hence the deposit is practically inexhaustible; and it now contains about fifty million cubic feet of chemically pure crystallized sulphate of soda, ready to be utilized.' Near Independence Rock, seventy-five miles north of Rawlins, in the valley of the Sweetwater, are deposits of bi-carbonate of soda. Here are about one hundred lakelets, covering an area of three hundred acres, making a deposit one mile in length, by half a mile in breadth. Part of these are solid soda, and part are filled with

strong alkaline water. In one of these lakelets of solidified soda, borings have been made to the depth of forty feet without passing beyond the soda formation. When we consider that the consumption of soda in the United States amounts to two hundred fifty millions of pounds per annum, — all of which is imported at a cost of $47 per ton, with 20 per cent ad valorem duty, making the cost $56.40 per ton, — it would seem as though Wyoming furnished a wonderful opportunity for both capital and enterprise in the soda business. At Rich Creek, near the Union Pacific Railway, there is reported to be a deposit of sulphate of magnesia, in nearly a pure state, covering one hundred acres to the depth of several inches. Gypsum, of fine quality, is found in many localities; notably in the Wind River Valley, on Horseshoe Creek, and near Red Buttes. Kaolin, or porcelain clay, has been discovered in Albany county; and mica at both Diamond Peak and in the Laramie Mountains, thirty miles northwest of Fort Laramie. Sandstone, marble, limestone, and clay for brick, are abundant."

Another writes: "Wonderful stories are told of the natural wealth of Wyoming Territory. There is said to be a mountain of solid hematite iron in the heart of the Territory, with six hundred feet of it above ground, more than a mile wide, and over two miles in length; a bed of lignite coal big enough to light the world for centuries; eight lakes of solid soda, one of them over six hundred acres in extent and not less than thirty feet in depth; and a petroleum basin which contains more oil than Pennsylvania and West Virginia combined, from which in places the oil is oozing in natural wells at the rate of two barrels a day." Also, "an extensive deposit of rubidium, a rare metal worth $5000 a pound, has been discovered near Rock Creek, in this Territory."

OREGON AND WASHINGTON.

The settlement of this portion of the New Northwest commenced so much earlier than that of the States and Territories considered, that, strictly speaking, they might not be embraced in the New West. But geographically they belong here; and, also, their claim to be considered in this connection cannot be denied, because of gold and silver mining within their domains.

The director of the United States mint gives the product of Oregon in 1883 and 1884 as follows: —

COUNTIES.	1883.			1884.		
	GOLD.	SILVER.	TOTALS.	GOLD.	SILVER.	TOTALS.
Baker . .	$190,000	$5,000	$195,000	$160,000	$2,500	$162,500
Benton . .	5,000	. . .	5,000	5,000	. . .	5,000
Coos . . .	5,000	. . .	5,000	20,000	. . .	20,000
Curry . . .	20,000	200	20,000	20,000	200	20,000
Grant . .	240,000	25,000	265,000	200,000	15,000	215,000
Jackson .	135,000	2,000	137,000	100,000	1,000	101,000
Josephine	175,000	2,000	177,000	110,000	1,000	111,000
Union . .	60,000	800	60,800	45,000	300	45,300
Totals . .	$830,000	$35,000	$865,000	$660,000	$20,000	$680,000

He estimates the production of Washington Territory for the same year: Gold, $85,000; silver, $1000; total, $86,000; with the additional encouragement of increase from year to year.

The gold and silver product of Oregon and Washington was *one and a half million dollars* ($1,500,000) for year ending June 30, 1890.

SUMMARY.

Product of gold and silver in the New West for the year ending June 30, 1890: —

STATE OR TERRITORY.	GOLD.		SILVER.		TOTAL VALUE.
	FINE OUNCES.	VALUE.	FINE OUNCES.	COINING VALUE.	
Arizona	43,537	$900,000	1,500,000	$1,939,393	$2,839,393
California . . .	628,875	13,000,000	800,000	1,034,343	14,034,343
Colorado . . .	169,312	3,500,000	16,000,000	20,686,868	24,186,868
Dakota	140,287	2,900,000	50,000	64,646	2,964,646
Idaho	96,750	2,000,000	3,400,000	4,395,959	6,395,959
Montana . . .	169,312	3,500,000	15,000,000	19,393,939	22,893,939
Nevada	145,125	3,000,000	4,800,000	6,206,060	9,206,060
New Mexico .	48,375	1,000,000	1,130,000	1,461,010	2,461,010
Oregon	58,050	1,200,000	30,000	38,787	1,238,787
Utah	24,187	500,000	7,000,000	9,050,505	9,550,505
Washington . .	8,466	175,000	80,000	103,434	278,434
Totals	1,532,276	$31,675,000	49,790,000	$64,374,945	$96,049,944

The annual products of lead, copper, silver, and gold in the New West, from 1870 to 1885, are as follows:—

YEAR.	LEAD.	COPPER.	SILVER.	GOLD.	TOTALS.
1870	$1,080,000	...	$17,320,000	$33,750,000	$52,150,000
1871	2,100,000	...	19,286,000	34,398,000	55,784,000
1872	2,250,000	...	19,924,429	38,177,395	60,351,824
1873	3,450,000	...	27,483,302	39,206,558	70,139,860
1874	3,800,000	...	29,699,122	38,466,488	71,965,610
1875	5,100,000	...	31,635,239	39,968,194	76,703,433
1876	5,040,000	...	39,292,924	42,886,935	87,219,859
1877	5,085,250	...	45,846,109	44,880,223	95,811,582
1878	3,452,000	...	37,248,137	37,576,030	78,276,167
1879	4,185,769	...	37,032,857	31,470,262	72,688,888
1880	5,742,390	$898,000	38,033,055	32,559,067	77,232,512
1881	6,361,902	1,195,000	42,987,613	30,653,959	81,198,474
1882	8,008,155	4,055,037	48,133,039	29,011,318	89,207,549
1883	8,163,550	5,683,921	42,975,101	27,816,640	84,639,212
1884	6,834,091	6,086,252	43,529,925	25,183,567	81,633,835
1885	8,562,991	7,838,036	44,516,599	26,393,756	87,311,382
Total	...	...	...	...	1,222,314,187

The following lode veins yielded the sums opposite their names during the specified portion of 1880:—

Richman Consolidated, for eleven months	$2,449,642
Standard, for eleven months	1,545,854
Ontario, for eleven months	1,628,545
Chrysolite, for nine months, representing ore sold. Yield much greater . . .	1,689,752
Little Chief " " " " " " . . .	1,103,311
Iron Silver " " " " " " . . .	645,425
Eureka Consolidated, ten months of year	1,243,894
Manhattan, ten months of year	739,400
Northern Belle, ten months of year	1,111,525
Contention, ten months of year	867,686
Consolidated Virginia	1,588,620
California	782,298
Ophir	905,924
Silver King (Arizona), monthly	200,000
Home Stake (Black Hills), a new mine, total	840,000

Placer operations embrace millions of money in California, Idaho, Colorado, and Arizona. *One hundred and five million dollars* ($105,-

000,000) have been expended on hydraulic processes in Placer and Yuba counties, California, and it is estimated that *five hundred million dollars* ($500,000,000) will be taken out of the ground in the next few years.

The following mines have the sums of money set opposite their names respectively, as aggregate dividends, to Jan. 1, 1880: —

Consolidated Virginia	$42,930,000
Belcher	15,307,200
Savage	4,460,000
Yellow Jacket	2,184,000
Ophir	1,594,000
Consolidated Imperial	1,125,000
Confidence	78,000
Succor	22,800
California	30,950,000
Crown and Point	11,688,000
Gould & Curry	3,825,000
Hale & Norcross	1,598,000
Kentuck	1,252,000
Sierra Nevada	102,200
Darney	57,000
Total	$125,342,900

Will the mines fail? is a very natural inquiry, to which many miners even would answer Yes. Some have been exhausted; others have not. A class of mines will become exhausted; another class will not. The best authority on the subject says: —

"History shows that wherever a true fissure vein has been found it has never been worked out. Such veins have been, in fact, worked for ages without any perceptible diminution in their yield. Where ores have decreased in value, the ore bodies have increased in size, the increase of one compensating for the loss of the other. Some have even increased their yield, the quality of the ore remaining unchanged. Others have been found to deteriorate from veins of silver to those of baser metals."

ADDITIONAL FACTS AND STATISTICS.

The director of the mint at Washington, in his report for the fiscal year ending June 30, 1890, furnishes the two tables that follow, which we commend to the reader for their valuable and reliable information.

Approximate Distribution, by Producing States and Territories, of the Product of Gold and Silver in the United States for the Calendar Year 1889.

STATE OR TERRITORY.	GOLD.		SILVER.		TOTAL VALUE.
	FINE OUNCES.	VALUE.	FINE OUNCES.	COINING VALUE.	
Alaska	43,537	$900,000	8,000	$10,343	$910,343
Arizona.	43,537	900,000	1,500,000	1,939,393	2,839,393
California. . . .	628,875	13,000,000	800,000	1,034,343	14,034,343
Colorado	169,312	3,500,000	16,000,000	20,686,868	24,186,868
Dakota	140,287	2,900,000	50,000	64,646	2,964,646
Georgia.	5,176	107,000	360	465	107,465
Idaho.	96,750	2,000,000	3,400,000	4,395,959	6,395,959
Michigan. . . .	3,386	70,000	60,000	77,575	147,575
Montana	169,312	3,500,000	15,000,000	19,393,939	22,893,939
Nevada	145,125	3,000,000	4,800,000	6,206,060	9,206,060
New Mexico . .	48,375	1,000,000	1,130,000	1,461,010	2,461,010
North Carolina.	7,014	145,000	3,000	3,878	148,878
Oregon	58,050	1,200,000	30,000	38,787	1,238,787
South Carolina.	2,177	45,000	180	232	45,232
Texas	. . .	. . .	232,031	300,000	300,000
Utah	24,187	500,000	7,000,000	9,050,505	9,550,505
Washington . .	8,466	175,000	80,000	103,434	278,434
Alabama, Maryland, Tennessee, Virginia, Vermont, and Wyoming. . .	1,209	25,000	1,000	1,293	26,293
Total	1,594,775	$32,967,000	50,094,571	$64,768,730	$97,735,730

The product of gold and silver from the mines of the United States has been, since 1878, approximately as follows: —

Product of Gold and Silver from Mines in the United States since 1878.

CALENDAR YEARS.	GOLD.		SILVER.		
	FINE OUNCES.	VALUE.	FINE OUNCES.	COMMERCIAL VALUE.	COINING VALUE.
1878	2,476,800	$51,200,000	34,960,000	$40,270,000	$45,200,000
1879	1,881,787	38,900,000	31,550,000	35,430,000	40,800,000
1880	1,741,500	36,000,000	30,320,000	34,720,000	39,200,000
1881	1,678,612	34,700,000	33,260,000	37,850,000	43,000,000
1882	1,572,187	32,500,000	36,200,000	41,120,000	46,800,000
1883	1,451,250	30,000,000	35,730,000	39,660,000	46,200,000
1884	1,489,950	30,800,000	37,800,000	42,070,000	48,800,000
1885	1,538,325	31,800,000	39,910,000	42,500,000	51,600,000
1886	1,693,125	35,000,000	39,440,000	39,230,000	50,000,000
1887	1,596,375	33,000,000	41,260,000	40,410,000	53,350,000
1888	1,604,841	33,175,000	45,780,000	43,020,000	59,195,000
1889	1,587,000	32,800,000	50,000,000	46,750,000	64,646,464

The value of silver in this table, as in similar tables for other years published in the reports of the Bureau, has, for purposes of uniformity and comparison, been reckoned at the coining rate of silver, viz. $1.2929 per fine ounce.

The following table exhibits the product of the precious metals in the world for each calendar year since 1873. It gives the silver product at its commercial value, calculated at the average market price of silver each year, as well as its coining value.

Product of Gold and Silver in the World for the Calendar Years 1873–89.

CALENDAR YEARS.	GOLD.	SILVER.		
		FINE OUNCES (TROY).	COMMERCIAL VALUE.	COINING VALUE.
1873	$96,200,000	63,267,000	$82,120,000	$81,800,000
1874	90,750,000	55,300,000	70,673,000	71,500,000
1875	97,500,000	62,262,000	77,578,000	80,500,000
1876	103,700,000	67,753,000	78,322,000	87,600,000
1877	114,000,000	62,648,000	75,240,000	81,000,000
1878	119,000,000	73,476,000	84,644,000	95,000,000
1879	109,000,000	74,250,000	83,383,000	96,000,000
1880	106,500,000	74,791,000	85,636,000	96,700,000
1881	103,000,000	78,890,000	89,777,000	102,000,000
1882	102,000,000	86,470,000	98,230,000	111,800,000
1883	95,400,000	89,177,000	98,986,000	115,300,000
1884	101,700,000	81,597,000	90,817,000	105,500,000
1885	108,400,000	91,652,000	97,564,000	118,500,000
1886	106,000,000	93,276,000	92,772,000	120,600,000
1887	105,775,000	96,141,000	94,048,000	124,304,000
1888	110,244,000	108,888,000	102,243,000	140,784,000
1889	121,162,000	124,769,000	116,674,500	161,318,000
Totals	$1,790,331,000	$1,384,607,000	$1,517,817,000	$1,790,206,000

From the "Resources of the Rocky Mountains," by E. J. Farmer, we copy below some statistical tables and facts, adding thereto the production of the last few years to bring the report down to the present time: —

Gold and Silver — World's Production and Supply.

	Gold.	Silver.
Stock in 1492	$500,000,000	$400,000,000
Production 1492 to 1848	3,200,000,000	7,000,000,000
Stock in 1848	$3,700,000,000	$7,400,000,000

Yearly Production since 1848.

	Gold.	Silver.
1849	$61,500,000	$39,000,000
1850	70,500,000	39,000,000
1851	81,500,000	40,000,000
1852	132,750,000	40,600,000
1853	155,450,000	40,600,000
1854	127,450,000	40,600,000
1855	135,070,000	40,600,000
1856	147,600,000	40,650,000
1857	133,275,000	40,650,000
1858	124,650,000	40,650,000
1859	124,850,000	40,750,000
1860	119,250,000	40,800,000
1861	113,800,000	42,700,000
1862	107,750,000	45,200,000
1863	106,950,000	49,200,000
1864	113,000,000	51,700,000
1865	120,200,000	51,950,000
1866	121,100,000	50,725,000
1867	114,025,000	54,225,000
1868	109,725,000	50,225,000
1869	106,225,000	47,500,000
1870	106,850,000	51,575,000
1871	107,000,000	61,050,000
1872	99,550,000	65,250,000
1873	96,200,000	89,250,000
1874	90,750,000	71,500,000
1875	97,500,000	80,500,000
1876	95,000,000	74,000,000
1877	97,000,000	81,000,000
1878	86,500,000	73,500,000
1879	105,400,000	81,037,500
1880	94,800,000	72,125,000
1881	110,000,000	94,000,000
1882–90	850,681,000	998,106,000
Totals	$4,463,856,000	$2,831,218,000

Summary.

	Gold.	Silver.
Stock in 1492	$500,000,000	$400,000,000
Production 1492 to 1848	3,200,000,000	7,000,000,000
Production 1849 to 1890	4,463,856,000	2,831,218,000
Totals	$8,163,856,000	$10,231,218,000

An estimate of the aggregate production of the precious metals in all countries, from 1493 to 1881, inclusive, is as follows: —

NATIONS.	GOLD.	SILVER.	TOTALS.
Germany	...	$403,000,000	$403,000,000
Austria-Hungary	$339,000,000	398,000,000	734,000,000
Africa	750,000,000	...	750,000,000
Chili	195,000,000	134,000,000	329,000,000
Brazil	765,000,000	...	765,000,000
New Granada	894,000,000	...	894,000,000
Australia	1,500,000,000	...	1,500,000,000
Peru	100,000,000	1,565,000,000	1,665,000,000
Potosi (Bolivia)	216,000,000	1,869,000,000	2,085,000,000
Russia	875,000,000	125,000,000	1,000,000,000
Mexico	195,000,000	3,300,000,000	3,495,000,000
United States	1,630,000,000	570,000,000	2,200,000,000
Other countries	100,000,000	350,000,000	450,000,000
Grand total	..	...	$16,263,000,000

To the above *two billion dollars* more must be added to show the grand total to January, 1890, *one-half* of which should be credited to the United States. The aggregate reaches above *eighteen billion dollars.*

It is upon True Fissure veins that the great bonanza mines of the world have been located. Their names and productions are as follows: —

Bissenna Silver Mine	$16,311,000
Santa Anna "	21,347,000
Valaneta "	31,813,000
Parmillian "	70,000,000
Veta Madre "	335,935,000
Comstock "	365,000,000
Rio Grande "	650,000,000
Sierra Madre "	800,000,000
Potosi "	1,000,000,000

The world's annual production of gold and silver, of which the United States produces fully one-half, is at present	$200,000,000
During the last twenty-five years, India has taken an average of $38,000,000, and China $9,000,000, making the average yearly absorption of silver by these nations	47,000,000
In the arts, the United States is using in gold and silver $15,000,000 yearly, and the rest of the world fully $35,000,000 more, making in all per annum	50,000,000
Counting loss and abrasion	3,000,000
We have left for the purposes of coinage for the entire world only	$100,000,000

The report of J. Ross Browne on the "Mineral Resources of the United States west of the Rocky Mountains," has the following, which we copy that the reader may contrast twenty-five years ago with now: —

"From the best information available, the following is a near approximation to the total gold and silver product for the year ending Jan. 1, 1867: —

California	$25,000,000	Oregon	$2,000,000
Nevada	20,000,000	Colorado	2,500,000
Montana	12,000,000	New Mexico	500,000
Idaho	6,500,000	Arizona	500,000
Washington	1,000,000	Total	$70,000,000

"Add for bullion derived from unknown sources within our States and Territories, unaccounted for by assessors and express companies, etc., $5,000,000.

"Total product of the United States, $75,000,000.

"The bullion product of Washington is estimated by the surveyor-general at $1,500,000. That of Oregon is rated as high as $2,500,000. Intelligent residents of Idaho and Montana represent that the figures given in the above estimate, so far as these Territories are concerned, are entirely too low, and might be doubled without exceeding the truth. The product of Idaho alone for this year is said to be from $15,000,000 to $18,000,000. That of Montana is estimated by the surveyor-general at $20,000,000. Similar exceptions are taken to the estimates of Colorado, New Mexico, and Arizona. As I have no grounds for accepting these statements beyond the assertion that most of the bullion is carried away in the pockets of the miners, I am inclined to rely upon the returns of the assessors, express companies, and official tables of experts. Admitting that a fraction over seven per cent may have escaped notice, although reasonable allowance is made for this in the estimate of $70,000,000, and that a considerable sum may be derived from sources not enumerated, I feel confident the allowance of $5,000,000 is sufficient to cover the entire bullion product of the United States for the year 1867; thus making the aggregate from all sources $75,000,000, as stated in the report of the Secretary of the Treasury.

"I have endeavored to obtain returns of the annual product of each State and Territory since 1848; but, for the reasons already stated, and in the absence of reliable statistics, it has been impossible to make the necessary division with more than approximate accu-

racy. As nearly as I can judge from the imperfect returns available, the following, in round numbers, is not far from the total product: —

California	$900,000,000
Nevada	90,000,000
Montana	65,000,000
Idaho	45,000,000
Washington	10,000,000
Oregon	20,000,000
Colorado	25,000,000
New Mexico and Arizona	5,000,000
In jewelry, plate, spoons, etc., and retained for circulation on Pacific coast	45,000,000
Total	$1,205,000,000

"Add for amounts buried or concealed, and amounts from unenumerated sources, and of which no account may have been taken, $50,000,000, and we have $1,255,000,000.

"This statement requires explanation. Up to 1855 a considerable portion of the gold taken from California was not manifested.[1] In 1849 the actual yield was probably $10,000,000; in 1850, $35,000,000; in 1851, $46,000,000; in 1852, $50,000,000; in 1853, $60,000,000; and in 1854, $53,000,000."

"Have precious gems been found in the New West?" it is asked. Yes; opals, topaz, amethyst, agates, jasper, onyx, garnets, carnelian, chalcedony, jet, sapphires, malachite, azurite, tourmaline, beryl, crystal, sardonyx, and diamonds, — all these are found in the New West, though not in that profusion, of course, for which they are known in the Orient.

MORALS OF MINING CAMPS.

Roughs became a prominent factor in the early history of most mining camps. But, in self-defence, the moral and reliable citizens soon weeded them out. Mining camps that have outgrown their swaddling-clothes will show a large per cent of intelligent, honest, enterprising, and virtuous citizens. Twenty years ago, when mining in the New West was in its infancy, Bayard Taylor visited many mining camps of Colorado, and, in a volume which he published subsequently, he said: —

"The degree of refinement which I have found in the remote mining districts of Colorado has been a great surprise. California,

[1] Large amounts were buried by miners to conceal it, and many of these miners died, so that their concealed treasures are buried still, except in a few instances where they have been accidentally unearthed.

after ten years settlement, retained a proportion of the rough, original mining element; but Montana has acted as a social strainer to Colorado; or, rather, as a miner's pan, shaking out a vast deal of dirt and leaving the gold behind. Mr. Leonhardy and his neighbors live in rude cabins, but they do not therefore relinquish the graces of life. It is only the *half* cultivated who, under such circumstances, relapse towards barbarism. Mountain life soon rubs off the veneering, and we know of what wood men are made."

We think that Charles H. Shinn, author of "Mining Camps," puts the matter clearly in the following paragraph: —

"As we have seen, there were times in almost every camp when the rowdy element came near ruling, and only the powerful and hereditary organizing instincts of the Americans present ever brought order out of chaos. In nearly every such crisis, there were men of the right stamp at hand, to say the brave word, or do the brave act; to appeal to Saxon love of fair play; to seize the murderer, or defy the mob. Side by side in the same gulch, working in claims of eight paces square, were, perhaps, fishermen from Cape Ann, loggers from Penobscot, farmers from the Genesee Valley, physicians from the prairies of Iowa, lawyers from Maryland and Louisiana, college graduates from Yale, Harvard, and the University of Virginia. From so variously mingled elements, came that terribly exacting mining-camp society, which tested with pitiless and unerring tests each man's individual manhood, discovering his intrinsic worth or weakness with almost superhuman precision, until at last the ablest and best men became leaders. They fought their way to the surface through fierce oppositions, and with unblenching resolution suppressed crime, and built up homes in the region they had learned to love."

The Anglo-Saxon race finally asserts itself in the mining camp, to control its boisterous elements, as it does in the town.

Mr. Shinn eloquently discusses this matter in another and grander phase, thus: —

"Though every mining camp perished to-morrow, the impulse that gave them birth would still survive. The local life, strength, and energy of the early camps has already passed as a powerful force, not as a name, into the warp and woof of society. . . .

"We walk the streets of San Francisco, — leaders in business here, who once were citizens of a camp and swingers of picks in the beds of mountain torrents. We enter the political field, — giants of debate and caucus here, whose first efforts to control their fellow-men were under the Mariposa oaks, or beneath the dome of Shasta. We

traverse the pastoral regions of the West, prairies dotted for miles with cattle, herds upon a thousand hills, — sun-browned patriarchal princes here, a hundred herdsmen at their command, five hundred horses in their *manadas*. . . . We visit the prosperous and beautiful colonies of Southern California, fair as a garden of the Lord, — realms of cherry and apple, olive and orange, grape and pomegranate, fig and guava, loquat and passiflora, fruits and flowers of two broad zones, mingled in rapturous profusion underneath azure skies as of Capri and Sicily, — and here also, in the midst of colonists from all parts of the world, is some man of pre-eminent force and dignity of character, trained in the school of the early mines, transmuting by earth's subtle alchemy his golden nuggets of '49 to yet more golden apples of Hesperides, and planting golden-banded lilies of Osaka in the place of golden leaves from Proserpine's subterranean gardens. We may even seek the great cities, whither all currents flow, — New York, London, Paris, Berlin, St. Petersburg, — the marts of commerce, the counting-houses of Barings and Rothschilds, the courts of czar and emperor, the wonderful Broadways of many a metropolis, flowing like Amazonian rivers day and night without pause, and we shall find men long trained in the lessons of the mining camps, walking as calm conquerors through the midst of this world of tumult, action, and desperate struggle, ruling railroad systems, laying ocean cables, planning for isthmus canals, aiding in a thousand enterprises that require energy, capital, knowledge of men, and prestige of former success, yet faithful in heart, cosmopolites though they are, to the memories of their young manhood, the companions of their Argonautic quest, the 'pards' of their pick-and-shovel days in Sierra or Rocky. Upon facts like these rest the social results of the mining-camp training."

True, corruption abounds in mining camps; and so it does outside. Vice and crime revel in some mining communities; so they do in a multitude of towns and cities throughout the land. Leadville, San Francisco, and even Virginia City, cannot compete with New York, Cincinnati, and Chicago, in the martyrdom of virtue. Neither ignorance nor immorality offer up such holocausts of human happiness in the New West as appall the East and South. With all their vices, the character of mining camps averages better than their reputation.

MINING KINGS.

MINING KINGS.

HORACE A. W. TABOR.

The life of H. A. W. Tabor is an illustration of the adage, "Providence helps those who help themselves," as well as of the following passage from Shakespeare: —

> "There is a tide in the affairs of men,
> Which taken at the flood, leads on to fortune."

He was born in Orleans County, Vermont, Nov. 26, 1830. In 1855 he emigrated to Kansas and engaged in farming. As an active member of the Free Soil party, he participated in the decisive scenes which marked the period during the dark days of border ruffianism. He was a member of the Topeka legislature in 1857, which was dispersed by Colonel Sumner at the point of the bayonet, by order of President Pierce. In 1859 he came to Colorado and went at once to Clear Creek County, spending the following winter in Denver. He located the next spring in California Gulch, where he was exclusively engaged in mining up to 1865. He then began merchandising, and followed it in connection with mining from that time on with varied success until May 1, 1878. At that time, although he had not succeeded in acquiring great wealth, he was far from poor, having accumulated a competency of some $35,000.

During these years of his mercantile life in California Gulch, he was always the firm friend of the miner and prospector; and it is said of him that he was ever ready to give them credit, however unfortunate may have been their successive ventures. In May, 1878, August Rische and George F. Hook, whom he had "grub-staked," made the discovery of the mine which has since become famous as the "Little Pittsburg," he being entitled by the agreement to one-third. Mr. Hook soon afterward disposed of his interest in the claim to his partners, and Mr. Rische, in turn, sold out to the Hon. J. B. Chaffee and D. H. Moffat, Jr.

In 1879 Mr. Tabor disposed of his interest in the Little Pittsburg for $1,000,000, Messrs. Chaffee and Moffat being the purchasers, and then purchased about one-half of the stock of the First National Bank of Denver, at the same time purchasing the Matchless mine at Leadville. He also owned a fourth interest in the mining property, of Borden, Tabor & Co., comprising five or six mines which yielded $100,000 a month. Of his mining property in the San Juan country,

we mention the Alaska, Adelphi, Acapulco, and the Victory mines, situated in Poughkeepsie Gulch, in all of which he is interested, besides which, he is the sole owner of the Red Roger and the Saxon. All these mines are in an advanced stage of development. He has also valuable mining property in Alpine. Although making such extended investments in mines, with the result of inspiring confidence in the mineral resources of Colorado, and attracting other capitalists to the new State, he has not confined his attention to mining interests alone, but has employed a portion of his wealth in permanent improvements in both Leadville and Denver, owning in the latter city alone, about $225,000 worth of real estate. During the year 1880 he completed a fine brown-stone front, five-story building, costing about $165,000, on the corner of Sixteenth and Larimer streets, the ground floor being devoted to elegant stores, the First National Bank occupying the corner.

In Leadville, in addition to his mining property, he has some $65,000 worth of real estate. His fine opera-house, costing about $35,000, was completed in sixty days from the letting of the contracts. Senator Tabor was for a long time a director of the First National Bank of Denver, and also vice-president of this bank. He held the office of county treasurer of Lake County, and was mayor of Leadville during the first fourteen months of its existence as a city. He was also president of the Leadville Improvement Company, to which is due the only really fine street in Leadville, — Harrison Avenue, ninety feet wide, — which this company laid out and donated to the city. He was also president of the Leadville Gas Company, which was organized in July, 1879, and on the 1st of November following had three and a half miles of mains laid. Senator Tabor's decision of character, quickness of perception and promptness of action mark his every movement. He no sooner decides than he begins to act. To illustrate: The transaction before alluded to, by which he closed out his remaining stock in the Little Pittsburg Mining Company for $1,000,000, bought eight hundred and eighty shares of the First National Bank of Denver, and at the same time purchased the Matchless mine at Leadville for $117,000, took place in the short space of fifteen minutes.

In October, 1878, he was elected the first lieutenant-governor of Colorado, and believing no man should accept a public trust without performing its labors to the best of his ability, he at once devoted his attention to preparing himself for parliamentary duties, and, as president of the senate, acquitted himself with great honor, and proved

one of the best parliamentarians who ever occupied the position of presiding officer over that body. Governor Tabor's heavy investments in Chicago property have attracted the attention of the whole country, and produced a stimulating effect upon the real estate market of that city.

The grand-opera house building, the handsomest in America, was erected in 1882, and it will ever remain a lasting monument to Mr. Tabor's enterprise, public spirit, and generosity. His election to the United States Senate in 1883, by the legislature of Colorado, was a fitting testimonial of the high regard entertained for him by his Colorado admirers. Although for a limited period, it was none the less a high honor of which any man might feel proud.

Under his management the Matchless mine has been a constant producer, amounting in some months as high as $80,000.

His investment comprising 175,000 acres of copper lands in the State of Texas, promise him a future income beyond calculation. Another investment illustrating his sagacity and keen business judgment is the 4,600,000 acres of cattle-grazing lands in Southern Colorado. In addition, Senator Tabor is largely interested in numerous mining companies, irrigating canals, mining and other enterprises, giving employment to hundreds of men, and aiding in the development of the vast resources of our New West.

His concession from the president of the Republic of Honduras is a veritable "Aladdin's lamp" opportunity. It comprises every alternate section of land, for four hundred miles, bordering upon the Patook River. Upon this land are immense groves of mahogany, ebony, and other valuable woods; banana and other tropical fruit orchards; gold, silver, coal, and other mineral deposits. In addition to the section grant, he has a mineral grant of one hundred and fifty square miles in the interior. Mr. Tabor is probably the largest land-owner in the world.

His great Tam O'Shanter group of mines near Aspen, Colorado, the famous New Mexico mines, the wonderful acres of mineral deposits, comprising his Old Mexico properties, and other possessions, really makes it too exhaustive to even enumerate.

JOHN L. ROUTT.

He was born in Eddyville, Lyon County, Kentucky, in 1826. In 1835, when John was ten years old, his parents removed to Bloomington, Ill., where he lived on a farm four years. There was not

excitement and promise enough in farm life to a boy of his enterprising spirit, and he desired another vocation. His parents were inclined to favor his choice, and, after canvassing the matter quite thoroughly, John was apprenticed to a carpenter. Before the carpenter's trade was fully learned, however, circumstances seemed to favor a change, and he shifted to the trade of a machinist, continuing to follow it until he was twenty-five years of age. His tact in trading, with a strong inclination in that direction, led him about that time into speculation in land and stocks. His ability in this line drew attention to him, and he became the first collector of Bloomington township in 1858, and in 1860 was made sheriff of his county. The war of the Rebellion soon broke out, and he became a soldier in the Union army. Here, his tact, ability, and loyalty, attracted the attention of the officers under whom he served, and, without even an application on his part, he was appointed assistant quartermaster, with rank of captain. He proved to be the right man in the right place. Important trusts were committed to him, and he discharged them with a promptness and fidelity that won the confidence of his superior officers. His accounts with the government were kept so accurately, that, at the close of the war, they were adjusted without the least difficulty, — a fact that could not be stated of a large number of quartermasters in the Union army.

At the close of the war, he returned to Bloomington, and soon after was elected county treasurer, an office which he filled very acceptably four years. In this position he rendered efficient service in settling the "bounty cases," and also in planning and building the magnificent court-house in Bloomington.

In 1869 President Grant appointed him chief clerk in the bureau of second assistant postmaster-general, at Washington, in which office he proved himself able and efficient, until the President appointed him United States marshal for the southern district of Illinois, in 1870. Both of these positions were offered to him without any solicitation on his part. Offices came to him unsought, for he was in no sense a scheming politician.

He had acted as United States marshal scarcely a year, when he received the appointment by telegram from Washington, of second assistant postmaster-general. His efficiency when he was chief clerk of that bureau was the reason of this appointment. A good chief clerk would make a good assistant postmaster-general. He continued in this office until 1875, when the President appointed him Territorial governor of Colorado. The appointment was so popular at

Washington that Congress determined to do him special honor by their confirmation. On receipt of the appointment, the Senate went into executive session immediately, and, in eight minutes after being called to order, confirmed his nomination by a unanimous vote. The same ability and fidelity which had characterized him in other positions, made him successful and honored as Territorial governor. He won the public confidence so largely, that one year later, when Colorado became a State, he was elected its first governor. Large-hearted, public-spirited, with uncommon practical ability, his gubernatorial career was a grand success.

On retiring from public life, he engaged in the mining business at Leadville. He purchased the Morning Star, in October, 1877, for *one thousand dollars*. Of course the mine was not a promising one; the low price proves that. But Routt could see further into the ground than many people, and he had strong faith in his purchase. He pushed the development of his mine, sometimes under discouraging circumstances, every month running into debt, paying eighteen per cent interest for borrowed money. The resolute man kept pushing forward for about two years, when his perseverance and foresight were rewarded by discovering the richest silver mine in Colorado. Before its full value was determined, he sold two-fifths of the mine in order to pay the heavy debt under which he was staggering. Soon afterwards he found that he possessed a mine which *three million dollars* ($3,000,000) could not buy. It yielded him *fifty thousand dollars* ($50,000) per month.

Mr. Routt resides in Denver, occupying one of its palatial residences, looking after his mining interests, which are extensive and prolific, and sharing the confidence of the community whose welfare he has ever sought to promote.

JOHN P. JONES.

John P. Jones was born in Herefordshire, England, in 1830, being now sixty-one years of age. His parents were upright and intelligent, as well as enterprising and industrious. His father hoped to improve his material condition by emigrating to the United States, and he came to this country before John was a year old. He settled in the northern part of Ohio, where he purchased government lands, and devoted himself to farming. John began to labor on the farm as soon as he was old enough, and was an energetic, plucky boy. Before he was twelve years old, he was an indispensable aid to his

father, his filial love and obedience always controlling his service. He early enjoyed the small advantages of the inferior schools of that day and region, improving his time with commendable application. Soon after entering upon his teens, he was sent to school at Cleveland for a time. His stay was comparatively short, however, as the purse of his father was not sufficiently ample to endure a heavy strain; and then the farm demanded his labors.

He was eighteen years old when gold was discovered in California; and the excitement occasioned thereby throughout the country caught him up in its whirlwind sweep, and set him down at the "Golden Gate." His parents were not altogether in favor of this great change, since they possessed a somewhat just estimate of the society of a new country, and especially the temptations of a mining camp. But the enterprising spirit of the boy, and the hope that everything would turn out for the best, secured their consent finally; and so, with plenty of good advice and a small capital, he hurried away to California, where he began both farming and mining in one of the inland counties. That he was successful in a good degree is evident from the fact that he won the confidence of his fellow-citizens as to character and ability. They committed to him important trusts, and finally elected him to the General Assembly, and afterwards to the State senate. For a series of years he was personally identified with public interests, at the same time accumulating considerable property, though not rich according to the California standard.

When public attention was turned to the silver mines of Nevada, in 1867, he resolved to take up his abode in that Territory and strike for a fortune. Going thither he found almost insurmountable obstacles in his way, not the least of which were the depredations of the Apache Indians. But his courage and perseverance served him a good purpose, and, in spite of savages and desperadoes, he pursued his mining operations with marked success. Wealth poured in upon him, not only by thousands, but also by millions; and the Ohio farmer boy soon became known as the Nevada millionnaire. As "money makes the mare go" in the New West, as it does elsewhere, his influence and popularity increased with his riches, and Nevadians soon learned to submit valuable trusts to his care. Finally, he was elected to the United States Senate as one of the silver kings of silvery Nevada. He took his seat in the Senate, as a Republican, on March 4, 1873. He has been twice re-elected to that position by the Republican party of Nevada, and his recent senatorial term

terminated on March 3, 1891. The expiration of that term of service last March consummated a round eighteen years of senatorial life, a fact that proves his labors in this public capacity to have been satisfactory to his constituents.

JAMES GRAHAM FAIR.

James G. Fair was born near Belfast, Ireland, Dec. 3, 1831, and is therefore one year the junior of Senator Jones. His parents came to this country in 1843, when James was twelve years old. They settled in Illinois, which was on the outskirts of civilization at that time. A purchase of government land secured a farm of ample dimensions on which James worked with his father, at the same time attending school whenever an opportunity offered. The school privileges of Illinois were very limited then, but such as they were he enjoyed, and finally went to school for a time in Chicago. This constituted all the schooling he ever had.

He was seized with the gold fever in 1849, and it raged for months before his parents consented that he should go to California. Seeing no prospect of curing the fever by any remedies known to them, they yielded to his importunities, and away he went to the El Dorado that had lured his soul. He engaged in mining at once; and with commendable industry and perseverance was tolerably successful, though he by no means realized his high expectations. He maintained his integrity, however, amidst the temptations and corruptions of the mining camp, and never so much as abandoned the thought of making a fortune in that land of gold. Thus he planned and labored until 1860, when he concluded that Nevada was nearer to a fortune for him than California was. He was financially prepared to engage in business in that Territory, which is considerable more than could be said of many who emigrated to that Apache-smitten country. He began operations at once, in a spirit that seemed to assure success at any price; and his operations enlarged rapidly to huge dimensions. No bonanza worker ever constructed larger quartz-mills, nor built water-works on a more practicable and grander scale. He was now successful even beyond his anticipations. His income increased to such an extent as to startle himself. He got more than he bargained for. His riches became immense speedily. The poor Irish boy became a millionnaire almost before he dreamed of such an experience.

At that time John W. Mackay, James C. Flood, and William S.

O'Brien, were successful miners in California, and Fair entered into partnership with them. This union made a remarkably strong firm financially, and they "purchased the control of the Bonanzas and various other well-known mines," in Nevada, which turned out wealth to fabulous amounts. Mr. Fair superintended the operations, and it is claimed that, during the time he managed the business, over two hundred million dollars were taken out of the mines. He is extensively engaged, also, in the manufactures of the Pacific coast, and in real estate and building in San Francisco. He is not now a member of the firm spoken of, having withdrawn several years ago. His wealth is estimated at *twelve millions*. He was elected to the United States Senate, and took his seat March 4, 1881. His term of service expired March 3, 1887, since which time he has passed away.

JEROME B. CHAFFEE.

The life of Jerome B. Chaffee was identified with the history of Colorado. He was born in Niagara County, State of New York, April 17, 1825. He received an academic education, and when quite young removed to Michigan. Subsequently he removed to St. Joseph, Mo., where he engaged in banking. In 1857 he organized the Elmwood Town Company, in Kansas, and became secretary and manager. In the spring of 1860 he took up his abode in Colorado for the purpose of mining. He located in what is now Gilpin County; and, in company with Eben Smith, erected the Smith & Chaffee Stamp Mill.

He secured the consolidation of several lodes, known since as the famous "Bob-Tail Lode and Tunnel," its name being derived from the fact that a bob-tailed ox, harnessed to a drag, was used for hauling the pay-dirt to the gulch for sluicing. In 1869 he effected another and large consolidation, and became the heaviest stockowner in the company. This company became known as the most prosperous as well as most extensive mining corporation in Colorado, producing annually from $300,000 to $500,000. A few years thereafter Mr. Chaffee owned a hundred gold and silver lodes — more than any other man in Colorado at that time. Among them was the celebrated Carabou Silver Mine. He was a stockholder also in the celebrated "Little Pittsburg Consolidated Mining Company."

In 1865 Mr. Chaffee purchased the business of Clark & Co., bankers in Denver, and organized the First National Bank, of which he became president, and continued in that office until 1880. Under

his management this bank became one of the most reliable and popular institutions of the kind in the country.

His political career began in 1861, when he was sent from Gilpin County to the first Territorial Legislature as a Republican. In 1863, he was returned to the Legislature, and was elected speaker of the House of Representatives. In 1865 the people of Colorado organized a State government under an enabling act of Congress, and Mr. Chaffee was elected United States Senator.

In Congress, he was very industrious and influential, securing the passage of many acts of great benefit, not only to Colorado, but to other States as well. It was through his efforts that necessary and beneficial legislation in behalf of the Indians was accomplished at that time.

In 1876, under the new State government, he was elected again to the United States Senate, with Hon. H. M. Teller, drawing the short term, which began December, 1876, and expired March 3, 1879. The longer he continued in Congress, the more valuable his public services became. During his short term in the United States Senate he was influential in securing enactments for the better development of the mining interest in the New West, improvement in the methods of managing railroads, together with several other matters of equal importance to the country.

Mr. Chaffee was a pronounced Republican, and was sent as delegate to every presidential nominating convention, from the birth of the party to the time of his death, which occurred in 1884. He was the possessor of great wealth, and used it freely in developing the resources and promoting the interests of his own State, whose people cherish his memory because of the debt of gratitude under which his public acts placed them. "Accustomed to enterprises of great magnitude, he was, in business, distinguished for great breadth of views, quickness of perception, and promptness of action, which enabled him to comprehend almost instantly plans of the greatest moment, and at once to put them into execution."

NATHANIEL P. HILL.

The subject of this sketch was born in Orange County, State of New York, in 1832. His father was a farmer, more intelligent and enterprising than many of his fraternity in that locality; and these qualities gave him popularity and influence in town and county. He served the State as a member of the General Legislative Assembly,

and for a number of years filled the office of county judge creditably. He valued culture, and sought the best school advantages for his children that the times and place afforded. His wife, the mother of our subject, was a helpmate in every sense of the word, fitted by her intelligence and solidity of character, to occupy the highest seat of honor with her husband.

Nathaniel had a good start, of course. To start well from the fireside is a good start indeed. Many fail in life for the want of it. It helped him to succeed. He loved books and school, was obedient, willing to work, enterprising and persistent, just the boy to be thought well of in the neighborhood. Early in life he decided, in his own mind, to obtain a liberal education, and his parents favored his ambition. He employed his evenings and leisure hours out of school in intellectual improvement. His plans were somewhat interrupted, however, by the death of his father, when Nathaniel was sixteen years of age. From that time the management of the farm depended on him, a responsibility which he accepted without any misgiving. While taking good care of the large farm with its onerous burdens, he studied hard every evening and during the winter seasons, so that he was well fitted for college at twenty-one years of age, and entered Brown University, Providence, R.I., where he distinguished himself as a scholar. Physical science was his favorite study; and having graduated with high honors, he was immediately appointed tutor in the chemical department. His success there led to his appointment as professor of chemistry in 1860, in which capacity he taught until 1864. That year he was sent by a party of Boston and Providence capitalists to Colorado, to report on the Beaubien land grant, with a view to a purchase. While there, his attention was directed to the wasteful methods employed to save the precious metals. He saw at once that the opportunity for great improvement in the method of smelting ores was before him, and he seized it. He studied the subject thoroughly, visited the smelting establishments of Europe, and then, having secured the co-operation of abundant capital, he organized the "Boston and Colorado Smelting Company." A furnace was erected at Black Hawk, and was enlarged from year to year, as the business rapidly increased, and in 1878 the works were removed to Denver, where they have grown into the enormous "Argo Smelting Works," the business of which, from its start, amounts to about *thirty-nine million dollars.* The total weight of gold shipped by the company to Jan. 1, 1886, was *twenty tons of gold* and *seven hundred and eighty tons of silver.*

In 1879 Professor Hill was elected to the Senate of the United States, where he distinguished himself by his wisdom and ability. His influence was felt in almost every important measure before the Senate, and his record was unimpeachable from beginning to end.

Although Professor Hill does not represent mining ores particularly, as do the mining kings to which attention has already been called, nevertheless, he represents a most important branch of the industry, which, under his efficient management, has served to develop the mineral resources of Colorado rapidly, successfully, and wonderfully.

J. F. MATTHEWS.

J. F. Matthews was born on the island of Cuba, in 1847, and is now forty-four years of age. His father was a sugar-dealer, the chief partner in the firm of Matthews & Safford, which had business connections with the well-known sugar-house of Moses Taylor in New York. At the age of eight years his father sent him to school in New York City. At twelve years of age he entered the college at Georgetown, D.C. After three years' study ill health forced him to leave college, and he returned to Cuba. For three years he was connected with a mercantile house in that island, then travelled extensively in Europe for pleasure and profit, finally accepting a clerkship in Paris with a large South American house. He remained three years in Paris, then returned to America, settling in Philadelphia, where he married a Miss Patterson, and accumulated some property in the shipping trade.

In 1875 Mr. Matthews removed to Colorado, and entered into the business of ore sampling and concentration, at Georgetown, the name of the firm being Matthews & Co. In 1875 the works were reduced to ashes by a disastrous fire. But with his accustomed pluck and energy, Mr. M. set himself to work at once to retrieve his fortune, the result of which was the firm of Matthews & Webb, "Ore and Bullion Brokers," of Denver. The amount of business which this company do may be learned from the fact that, in 1886, it amounted to *three million dollars*, and has increased every year since. Another says: "J. F. Matthews is a gentleman of unusual ability. He has built up the great business just noticed from a very small beginning, having won the good will and confidence of every one by his high qualities as a citizen, and his perfect fairness and rectitude as a business man.

V. MARVELS OF STOCK-RAISING.

THE paradise of stock-raisers lies between the Missouri River and the Pacific coast. The New West is the kingdom of "cattle-kings." They live royally in this empire of prairie and valley. They spread a table for both Americans and Englishmen. Ubiquitous Yankees exchange courtesies with Brother Jonathan under the shadow of the snow-capped Rockies. All the cattle of the New West, gathered into one imposing "round up," would convert the "Great American Desert" into a stockyard, to challenge the curiosity of the world.

The statistician of the Department of Agriculture at Washington reports the whole number of farm animals in the United States, January, 1891, as follows: —

Horses	14,056,750	Sheep	43,431,136
Mules	2,296,532	Swine	50,625,106
Milch Cows	16,019,591		
Oxen and other cattle	36,875,648	Total	163,304,763

Of this number, the following table shows how many are found in the New West: —

LOCALITY.	HORSES.	MULES.	MILCH COWS.	OXEN AND OTHER CATTLE.	SHEEP.	SWINE.
Kansas	748,108	89,978	758,323	1,920,893	447,079	3,144,324
Nebraska	558,297	45,792	424,270	1,345,563	234,612	2,309,779
California	360,921	43,659	282,059	558,244	3,712,310	517,600
Oregon	181,236	3,647	102,040	724,592	2,431,759	220,639
Nevada	48,947	1,777	16,550	317,498	504,710	12,501
Colorado	124,052	4,800	62,285	1,017,465	1,819,569	23,606
Arizona	31,037	2,055	16,720	725,004	593,643	20,140
Dakota, N. and S.	237,244	17,016	211,336	739,815	274,319	428,912
Idaho	89,612	1,738	32,068	381,732	501,978	34,100
Montana	151,547	1,838	34,005	932,697	2,089,337	35,105
New Mexico	33,504	9,750	19,356	1,341,856	3,123,663	24,852
Utah	90,609	4,055	52,910	383,553	2,055,900	47,641
Washington	148,291	1,306	92,005	443,257	673,060	147,713
Wyoming	142,986	2,304	13,005	1,096,101	1,119,110	10,400
Totals	2,946,391	229,715	2,116,932	11,928,270	19,581,049	6,977,312

There has been a decrease in the number of farm animals in the New West in the last three or four years, the causes of which are well known. The Report referred to, says: —

"The most prominent reason for the failure to increase numbers during the year is the necessity, which growers in almost all sections of the country feel, of reducing herds on account of the short corn crop. It was necessary to retain as small a number of cattle as possible on the farm. With high-priced corn and, in many sections where drought prevailed last season, dear hay and other forage, growers felt compelled to part with their surplus stock at any price rather than attempt to carry it through the winter."

The same authority at Washington reports the available pasturage of all grades of quality, still in possession of the government, after examination of the entire area, and consultation with stock-growers and others, as follows: —

	Acres.		Acres.
Dakota	75,000,000	Idaho	35,500,000
Nebraska	47,000,000	Washington	25,300,000
Kansas	50,000,000	Oregon	45,000,000
New Mexico	63,374,400	California	69,850,000
Utah	32,500,000	Nevada	38,299,789
Colorado	45,440,000	Arizona	40,000,000
Wyoming	50,000,000		
Montana	68,500,000	Total	685,733,789

Much of the so-called grazing land is annually converted into arable land; so that the acreage of the former is constantly diminishing, while that of the latter is increasing.

The foregoing statistics become more significant when we consider that only four of the fourteen States and Territories mentioned had any stock to report in 1850. Savages and herds of buffalo roamed over this vast domain, but stock-raisers were unknown there. Ten years later, in 1860, there were still five Territories having nothing of the kind to report. Even Colorado had but just begun to live, with no stock-raising to record. The same was true of Arizona, Idaho, Montana, and Wyoming. As late as 1870, Colorado reported only 6,446 horses, 1,173 mules, 25,017 milch cows, 5,566 working oxen, and 40,153 other cattle — a total of 78,355. Of sheep, the Territory could boast of only 120,928, and of swine, 5,509. The value of all this live stock was only $2,871,102 — less than three million dollars! The growth of this industry in Colorado, in twenty years, is marvellous indeed. From two hundred thousand animals to more than *three million!* From less than three million dollars in value to *sixty million!*

In 1870, Montana had but 5,289 horses, 475 mules, 12,432 milch cows, 1,761 working oxen, and 22,545 other cattle — a total of only 42,502 — with 2,024 sheep and 2,599 swine. The whole value of this live stock was less than two million dollars; in twenty years advancing from forty-eight thousand animals to some over *three million* — nearly forty times as many animals now as then; from a value of less than two million dollars to nearly *thirty million dollars*.

The growth of this industry in other parts of the New West is equally marked, but our limited space forbids further particulars. I may add, however, that as the States and Territories grow older, the grazing lands diminish and the farming lands increase. Only a few years ago, Kansas was an immense grazing section; but now its lands are surveyed and fenced farms. Agriculture crowds out stock-raising. Within a few years the same will be true of Nebraska and Colorado; and, finally, the whole New West will succumb to this process of bringing the land under cultivation. Not that stock-raising will be supplanted; but improved breeds of cattle will be raised on fenced farms, where they can range over but a limited area, and where they will be stalled and fed in winter after the manner of the East.

Governor Crittenden, of Missouri, addressed the first National Convention of Cattlemen in St. Louis, Nov. 17, 1884, and in his address, he facetiously remarked: —

"No history, aside from the Bible, gives an authentic account of the origin of cattle. Two and two they went into the ark with man, and from that time to this they have been the objects of trade, commanding at all times, from the day when Jacob outwitted his father-in-law, Laban, to this convention, the shrewdest and most refined intellects. Cæsar, in his Commentaries, states that the British in his time had great numbers of cattle, though of no special size or beauty; and those wild islanders were kept quite busy in keeping their cattle out of the way of the Roman eagles, showing that even then men and soldiers were no better than now — in 'handling stock.' The magnitude of the cattle trade in this country forms a subject of profound interest, not only to our own people, but also to those beyond the dividing seas. The immense herds, scattered from Maine to California, are the offspring of a single bull and one or more cows, imported into this country in 1493 by Christopher Columbus a few days before a custom house had been established upon our soil and officers appointed to vex travellers by inquisitive questions. They came in on the free list as raw material, and some acquisitive Mexicans, Americans, Indians, and negroes still think they are on the free list

— only convinced to the contrary by 'a short shrift and a long rope' in the hands of some travelling judges who still believe in that old, solemn law of mine and thine."

The magnitude of the cattle business, as expressed by the foregoing figures and remarks, was illustrated by Hon. Norman J. Coleman, United States Commissioner of Agriculture, at the National Cattle-Growers' Association in Chicago. He said: —

"If a solid column should be formed, twelve animals deep, one end resting at New York City, its centre encircling San Francisco, and its other arm reaching back to Boston, such a column would contain about the number which now forms the basis, the capital stock, so to speak, of the cattle industry of the United States."

Mr. Carnegie says: "Were the live stock upon Uncle Sam's estate ranged five abreast, each animal estimated to occupy a space five feet long, and marched round the world, the head and tail of the procession would overlap. This was the host of 1880; that of 1891 would be ever so much greater, and still it grows day by day, and the end of the growth no man can foretell."

On the average, if the live stock of our country were equally distributed, each family would have a horse, cow, four pigs, and three sheep. It is claimed that the amount of capital invested in cows exceeds by $40,000,000 the amount invested in bank stocks! The cattle, horses, sheep, and swine of the whole country represent a capital of *two billion five hundred million dollars* ($2,500,000,000).

WHAT CATTLE EAT.

Throughout a very large portion of the New West cattle graze through the whole year, requiring little more attention than herds of buffalo. Without cut-feed or shelter they shirk for themselves, and appear in the spring "round up," in a good condition, unless an exceptional cold and stormy winter has prevailed. The cut on the following page represents the two principal kinds of grass upon which cattle live and thrive between Missouri River and the foot-hills of the Rocky Mountains.

These grasses may be called perennial; for, springing up in the early season when their roots are bathed in moisture, they cover the great plains with an olive-green, which the excessive heat of a rainless summer dries and cures as it stands, from six to twelve inches high. The drying and curing process preserves the juices of the grass, and when it goes to seed, by a remarkable provision of Provi-

dence the seed does not drop and waste, but it is held tightly to nourish the animal kingdom so dependent upon it. All the nutriment is thus preserved; and this accounts for the excellent condition of cattle that appear to relish these grasses full as much when they are dry as when they are green. It is said that horses will leave the fresher and greener grass of the watercourse for this dried and cured hay, which appears innutritious and worthless to the traveller. The buffalo grass grows in bunches, as seen in the illustration, and both kinds stand up so stiffly that they are never broken down by the heaviest wind, rain, or snow.

1. BUFFALO GRASS. 2. GRAMA GRASS.
(Half Natural Size.)

In the winter the tops of the grass, containing the most nutritious part, — the seeds, — peer above the snow for the particular accommodation of cattle. Or if, perchance, the snow is unusually deep, and covers them, the cattle accommodate themselves readily to the situation, and with nose lay them bare and devour them. Snow does not remain long upon the ground in the grazing country, so that if these grasses were completely buried in snow, ordinarily cattle would not starve in waiting for its disappearance. In many localities, too, they find sufficient feed on hillsides and other protected spots to satisfy hunger while other localities remain buried in snow. The cut on the next page represents a collection of Kansas grasses.

A traveller in Montana furnishes the following interesting remarks respecting this remarkable bunch-grass: —

"At first I supposed that the color was derived from the nature of the soil, but I afterwards found out, by actually travelling over them, that they were covered with a species of grass which, as it is

approached, has the appearance of ripe grain which has stood long enough to lose its bright yellow color. This is the famous bunch-grass of Montana and Dakota. It does not cover the ground like the cultivated grasses of the East, or the blue grass of Kentucky and adjoining States, but grows in scattered bunches, so that, although, seen from a little distance, the ground appears to be entirely covered with it, it actually stands very thinly over the surface. This bunch-grass comes up in the spring and gets its growth during the rains of early summer. Then, when the dry season begins, the seed which it bears upon the top ripens, but instead of falling out, as the seeds of most grasses would do, is firmly held in the head which encloses it, and remains upon the stalk until the following spring. The stalk itself is strong and wiry, containing an abundance of silica, and is not easily broken.

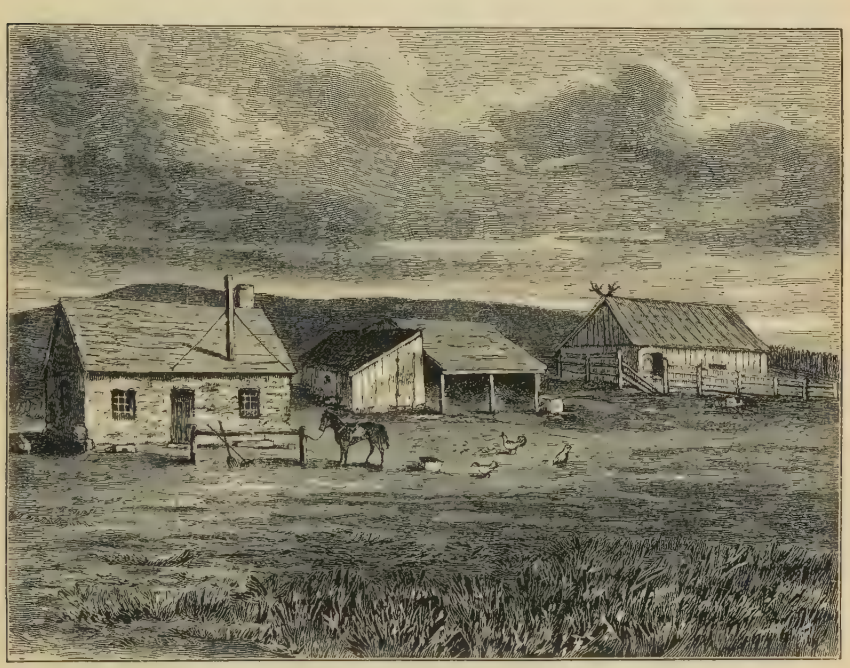
KANSAS GRASSES.

"When the cattle are turned out upon a range covered with bunch-grass, they browse off the heads containing the seeds, but do not eat the leaves and stalk, which are as destitute of nutrition as the stalks of rye, barley, or wheat would be. But the seeds seem to have concentrated in them all the elements fitted to furnish food for cattle which the grass, during its short period of growth, has been able to draw from the remarkably rich soil, and their fattening qualities are said to be equal to those of the best grain. It is because the cattle feed upon these seeds, rather than upon the leaves and stalks of grass, that Montana beef is of so much better quality than that raised in the Territories farther south."

CATTLE RANCH.

The first thing for the would-be stock-raiser to do is to secure a ranch. In Colorado he would do this by buying out a stockman who wants to sell, because all the government lands in that State are taken up. In New Mexico he would probably purchase government land, always selecting it where cattle can find plenty of water.

The following illustrations of homes on cattle ranches are the actual representations of homes that now exist.

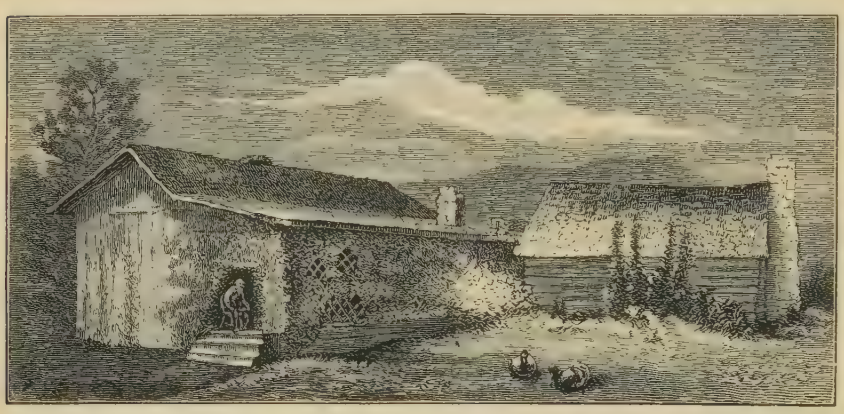


HOME ON A CATTLE RANCH.

The above illustration represents a house built of stone, and belongs to the best class of ranchmen's homes. It contains two large rooms and a loft, accommodations that are found upon few ranches only. The cut on the following page represents a log house by no means of the best class, and yet about the average dwelling of *rancheros*, as herders are called in Mexico. Few women are found on ranches, the necessary isolation and hardships being too masculine for feminine tastes. Occasionally, however, the married ranchman shares the privations of ranch life with his wife.

Cowboys sometimes occupy dug-outs. A ranchman describes his as follows: —

"It was now necessary to build some kind of a house, as the shanties we had hitherto used would afford but poor protection against the keen blasts of winter. The choice lay between a log-house and



HOME ON A CATTLE RANCH.

a dug-out; and as it would be difficult to get straight logs enough for the former, and it would take longer to build, and the weather was already getting cold enough to make living out of doors not very

A DUG-OUT.

enjoyable, we decided to make a dug-out. A dug-out is constructed by digging into a hill, which forms the back and sides of the dwelling. The front is made of logs, and the roof of sticks, on which grass

or hay is laid, covered by a thick layer of earth. A fireplace and flue are dug out at one side, and a chimney is carried above the roof by means of some stones or sticks plastered with mud. It is a primitive kind of house. Ours was not at all uncomfortable, and with a blazing log fire on the hearth, we knew little what the weather was like outside."

If he buys his land of the United States government, he finds an office near at hand, where maps and charts convince him that the method of coming into possession of what he wants is very plain and systematic.

The United States government surveys the public lands into a succession of lines of townships running north and south, parallel to each other, and each line of townships is numbered from the base line northward, the two in Diagram 1 being numbered, for example, 138 and 139 North, respectively.

Each of these lines of townships is called a "range," which number from the meridian east or west. This range, for example, is called Range 79 West.

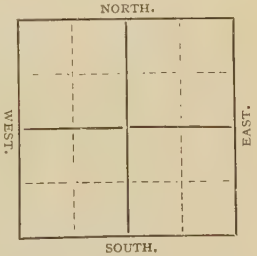
DIAGRAM 1.
Range 79 West.
NORTH.

6	5	4	3	2	1	
7	8	9	10	11	12	
18	17	16	15	14	13	T. No. 139.
19	20	21	22	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	
6	5	4	3	2	1	
7	8	9	10	11	12	
18	17	16	15	14	13	T. No. 138.
19	20	21	22	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	

SOUTH.
Range 79 West.

Diagram 1 shows two townships, numbered 138 and 139 North, respectively, in Range No. 79 West. The parallel line of townships west of Range 79 West would be numbered 138 and 139 North, respectively, in Range 80 West, and so on.

DIAGRAM 2.
Section 1, Township 139 N., Range 79 W.



Each township contains 36 sections, numbered as in Diagram 1, or 23,040 acres. Each section as shown in Diagram 2 (divided into 40-acre tracts), is one mile square, and contains 640 acres. Each section is divided into quarters, containing 160 acres each. Each quarter section contains 40 acres.

In describing lands, for example, the northeast 40-acre tract in Diagram 2, in section No. 1, in township No. 139 N., in range No. 79 W., would be described as follows: N.E. $\frac{1}{4}$ of the N.E. $\frac{1}{4}$ of Section 1, T. 139 N., R. 79 W.

The price of government land is $1.25 per acre, though millions of acres which lie in sections alternate with railroad lands are held at $2.50. The stockman usually buys the cheaper lands, unless he "pre-empts" one hundred and sixty acres, or acquires a title to his claim under the Homestead Law by living on it five years.

Cattle are not confined to the section or quarter-section, but roam at pleasure over the range from November to May, when the round-up begins. A Colorado stockman informed me a few years since,

HERD ON THE RANGE.

that, at the previous round-up, some of his cattle were found one hundred and fifty miles east of his ranch, one hundred miles west and south. Different herds mingle on the range, of course, making the annual round-up a necessity, that each stockman may find and possess his own. The round-up will be described hereafter.

Many stockmen do not live on their ranches. Cowboys take charge of the ranches, looking after the few horses, cows, and hens, which are kept thereon for immediate use. One cowboy can take care of a ranch ordinarily, from November to May, when the herd is wandering over the range for food. A pretty lonely time is his, too, spending six months in solitary house-keeping, with no neighbor, perhaps, within ten or twenty miles, and no post-office within twenty-

five or fifty miles. An occasional visit from the proprietor, bringing supplies and such advice as the circumstances require, breaks the monotony of the lonely and somewhat singular life.

This illustration is not a fancy sketch. It is the photograph of a stockman, taken when he was mounted and ready to start for his ranch a few score of miles away. Wearing "half an acre of hat" to protect his face from the hot sun, with a scarf about his neck for a like purpose, and his apparel well adapted to his business, his appearance is so changed that an introduction to his own wife may be quite necessary. He may be a millionnaire, though he looks like a shack. He may be as proud as Lucifer, but necessity arrays him in a homely dress; and he appears humble. Seated upon a Mexican saddle, which cost a hundred dollars, if it is a good one, and drawing up the reins of a bridle that cost twenty-five or fifty more, if it is worthy of an aspiring stockman, he puts spurs to his horse, and is off in a jiffy. Grass does not grow under his horse's feet. The animal is trained to the saddle, and the stockman is trained to him, and the two are so trained together, that they fly over the plain as if they were one thing, as much as the two parts of a whole. It is a lonely ride to his ranch, forty, fifty, sixty, perhaps a hundred miles away; but his head is full of business and his heart of contentment — about the happiest looking man, though he may be the homeliest, to be found within cattledom. If he happens to pass a prairie post-office, the unique affair serves to remind

OFF FOR THE RANCH.

PRAIRIE POST-OFFICE.

him that humans do live in the "silent and solemn country" through which he is passing.

When calling attention to the cowboy's home on the ranch, we should have said that many of these abodes are located where various poisonous creatures infest the country, as rattlesnakes, scorpions, tarantulas, and centipedes. On the shelf before me is a bottle of alcohol containing a scorpion and centipede which a stockman captured in his cabin and presented to me. He exhibited, also, the skin of an enormous rattlesnake, four and a half feet long; and his snakeship was caught just outside of his adobe cabin. And yet it is seldom that serious results transpire from the intimacy which these denizens of the Rocky Mountain region try to cultivate with ranch-life families. We think, however, that even cowboys will agree with us, that their room is better than their company.

A ranchman writes of rattlesnakes: "The rattlesnakes were mostly of a small species, and I used to kill one or two nearly every day during the summer. I once killed ten in three hours, not looking for them, but just getting off my horse when I heard one rattle, and destroying it. I generally killed them with my 'quist,' which is a kind of riding-whip, about eighteen inches long, made of raw hide and leather plaited together, with a piece of iron in the handle. A snake cannot strike unless it first coils itself up, so you can hit it when it is gliding off, with even a short weapon, without fear of the consequences. The dogs used occasionally to get bitten by rattlesnakes, but they always recovered in a day or two, without any treatment; and one of my horses was once bitten right on the nose. His head swelled up tremendously, and he could not eat for two or three days, but he ultimately recovered. When a man gets bitten, the cure chiefly relied on in the States is copious doses of whiskey, on the principle, I suppose, of *similia similibus curantur.*"

Below is the castle of the tarantula — a remarkable little nest, with its bevel-edged and closely-fitting door. It is built by the female, her husband possessing no talent or inclination in that direction. He is fierce and warlike, ever ready to kill his foe with his deadly poison. The female is shy, and stays at home to look after her family, with closed door when she is within her castle. On leaving her nest, the door is thrown wide open, and remains in that position until her return. At the approach of danger, she springs into her castle at a bound and closes the door behind her. The tarantula is venomous, and there are many of them in California, Colorado, Arizona, and New Mexico.

TARANTULA NEST.

Cattle are obliged to seek water for themselves as well as food. Hence the stockman looks for a well-watered ranch. It is not always possible to have all the water facilities desired, so that cattle must travel quite a distance, sometimes, to quench their thirst. If they have to travel two or three miles for water, they will drink only once in two or three days. They excel men and women in adapting themselves to circumstances. They understand the laws of storms full as well as scientists, and govern themselves accordingly. They surpass "Probabilities" in forecasting the weather, and know when a storm is actually approaching, as well as we who take and read the papers. For this reason they thrive and grow when we think they would starve, and live when we wonder they do not perish.

The profits of stock-raising have been large. For this reason, men have endured hardships and dangers, dwelling apart from friends and civilized society. The prospect of speedy fortunes reconciled them to privations for the time being.

We shall furnish the estimates of several reliable authorities, showing amount of capital invested, and the actual profits in a series of years.

A Dakota editor says that men unacquainted with the cattle business do not realize how rapidly cattle multiply when all the female progeny are allowed to breed. And he goes on to say: —

"If one hundred cows and their female progeny be kept at breeding for ten years, the result would be as follows, estimating that forty per cent of the cows would have heifers which would, beginning when two years old, in their turn have

100 cows in first year drop	40	402 cows in seventh year drop	161
100 cows in second year drop	40	525 cows in eighth year drop	210
140 cows in third year drop	56	686 cows in ninth year drop	274
180 cows in fourth year drop	72	896 cows in tenth year drop	358
236 cows in fifth year drop	94		
308 cows in sixth year drop	123	Total, ten years	1,428

CATTLE SEEKING WATER.

"The number of bulls would be the same as that of heifers. From the above an idea can be got of the rate at which capital increases in the live-stock business on the plains, where the cost of keeping a beef from birth to maturity is less than six dollars."

In *Harper's Monthly* of November, 1879, A. A. Hayes, Jr., who wrote after careful personal observation, follows some valuable sug-

gestions with an estimate of his own, which cannot be said to be rose-colored for that day.

"1. What amount of capital is needed?

"It would hardly be advisable to begin an independent business with less than five thousand dollars, of which three thousand would be invested in stock. It is common for men employed by owners to have a few cattle of their own, which range with their employers', and in this way they sometimes get quite a little property together, and are enabled to start on their own account. On the other hand, the profits on a large herd increase in a greater ratio than the expenses, and the figures to be given herein will be based on an investment large enough to secure this benefit.

"2. What profits may be expected in the stock business?

"The following may be pronounced a fair and reasonable commercial estimate, and it is put forward with only the remark that while the figures apply to circumstances as they are now, and there are chances and contingencies and possible disasters attending money-making adventures of all kinds, the margin here is so large that after making all allowances which caution may suggest, one has still the promise of great results.

We will suppose an individual or a firm to have found a ranch to suit him or them in Southern Colorado, and to have bought it. The cost is hard to fix; but one of 10,000 acres, in complete order, could not stand in at more than	$50,000		
A herd of 4,000 good cows could be bought at $18 each, or .	72,000		
And 80 good short-horn and Hereford bulls at an average of $50 each, or	4,000		
Making a total investment of		$126,000	
By careful buying in the spring one should get 70 per cent of calves with the cows, or say 2,800 calves. Of these, on the average, one-half, or 1,400, will be heifer calves. At the end of the first year affairs should stand as follows: —			
The 1,400 heifer calves will be yearlings, and worth	$14,000		
There will be also 1,400 yearling steers, worth $10 each, or .	14,000	$28,000	
With a herd of this size expenses may be put at not more than	$5,000		
And for contingencies, sundries, and ordinary losses it is safe to take 4 per cent on capital invested in stock, say on $76,000	3,040	8,040	
Profit at end of first year			$19,960
At the end of the second year the 1,400 heifers are two years old, and worth $5 more apiece, or say	$7,000		
And of the 2,800 (70 per cent of 4,000) new yearling calves, an average of one-half, or 1,400, will be heifers, and worth $10 each, or	14,000		

1,400 two-year-old steers are worth an additional $6 each, or .	$8,400		
And the 1,400 new yearlings are worth $10 each, or	14,000	$43,400	
Deduct expenses	$5,000		
And 4 per cent on $76,000 + $19,960 = $95,960	3,838	8,838	$34,562
At the end of the third year the original 1,400 heifers are three years old, and worth an additional $3 per head, or	$4,200		
The yearling heifers of last year are two years old, and worth an additional $5 each, or	7,000		
There are 1,400 yearlings from the original stock, worth . .	14,000		
And of the offspring of the three-year-olds (70 per cent of 1,400 = 980) one-half, or 490, are heifers, and worth	4,900		
The original 1,400 steers are three years old, and worth an additional $10 each, or	14,000		
The 1,400 steer calves of last year are two years old, and worth an additional $6 each, or	8,400		
And there are 1,400 yearlings, offspring of original stock, and 490, offspring of new three-year-olds — in all, 1,890 — at $10 each	18,900	$71,400	
Deduct expenses on 5,400 cows, say	$6,050		
And 4 per cent on ($95,960 + $34,562) $130,522	5,221	11,271	
Profits at end of third year			60,129
Total net profits for three years			$114,651

"1. No allowance need be made for depreciation of stock, as the cattle can with proper care always be sold for beef.

"2. If the profits be invested in cattle, they will be largely increased.

"3. No account is taken of interest on profits.

"4. No account is taken of the gradual improvement in the quality of the stock.

"5. Profit can often be made by buying cattle and keeping them for a year.

"6. During the latter part of the winter and the spring the food is of course poorer than before, and as the cattle are not then in the best condition, there is much demand for good beef for local consumption. By feeding cattle during those months for sale in Colorado, excellent gains should be realized. Good beef *on the hoof* was worth four and a quarter cents per pound in Pueblo in the spring of 1879.

"7. A ranch purchased in Southern Colorado at present prices is almost sure, in view of the great increase in the business and the decrease of suitable land, to appreciate considerably in value — say, at least ten per cent per annum.

"It will be plain to any one who will examine carefully into the

matter that under ordinary and favorable circumstances profits will mount up each year in an increasing ratio, and he can readily make figures for himself. In the mean time we have a balance-sheet at the end of the third year as follows: —

Assets.

Ranch, with three years' appreciation, at 10 per cent	$65,000
5,400 cows, at $18	97,200
80 bulls, at $50	4,000
1,400 two-year-old heifers, at $15	21,000
1,890 yearling heifers, at $10	18,900
1,400 three-year-old steers, $26	36,400
1,400 two-year-old steers, $16	22,400
1,890 yearling steers, at $10	18,900
Total	$283,800

Liabilities.

Capital put in ranch		$50,000
Capital put in stock		76,000
Capital used in expenses		28,149
Profits on stock, three years	$114,651	
Profits on ranch	15,000	$129,651
Total		$283,800

"A risk to be taken into account would be a possible outbreak of disease at some time, but out of profits as shown an insurance fund could readily be created. That so many cattle will be raised that prices will greatly fall need not be a matter of present fear; for, leaving out two most important factors, — the great and increasing demand for our beef in Europe, and the new uses to which it is put in this country, — our population has hitherto increased faster than the supply of good meat."

The foregoing estimates, and those that follow, were made when stock-raising was booming; and they show the possibilities of the business in favorable times. For several years past stock-raising has been under a cloud, and the profits have been comparatively small. England still demands American beef, and the rapidly increasing population of the country enlarges the consumption at home, — two facts that may inspire the cattleman's hope of prosperous business at no distant day. All occupations have their hard times, and cattle-raising must come in for its share; and sometimes the cause may not be quite understood.

Frank Fossett, in his "History of Colorado," has the following: —

YEAR.	COWS. Number of Cows.	Number of Calves.	Number of Heifer Calves.	Value when yearlings, at $10 per head.	Increased Value when 2 years old, at $5 per head.	Increased Value when 3 years old, at $3 per head,	Value when 3 years old, at $18 per head.
One	4,000	3,200	1,600	$16,000	$8,000	$4,800	$28,800
Two	4,000	3,200	1,600	16,000	8,000	4,800	28,800
Three	5,600	4,480	2,240	22,400	11,200	6,720	40,320
Four	7,200	5,760	2,880	28,800	14,400	8,640	51,840
Five	9,440	7,552	3,776	37,760	18,880	...	56,640
Six	12,200	9,856	4,928	49,280	...	...	49,280
Seven	16,096	12,877	6,438 at $6 per head.		...	...	38,628
Original Cows, at $18 per head	...	...	...	...	...	...	72,000
							$366,308

YEAR.	STEERS. —	—	Number of Steer Calves.	Value when yearlings, at $10 per head.	Increased Value when 2 years old, at $6 per head.	Increased Value when 3 years old, at $10 per head.	Value when 3 years old, at $26 per head.
One	...	...	1,600	$16,000	$9,600	$16,000	$41,600
Two	...	...	1,600	16,000	9,600	16,000	41,600
Three	...	...	2,240	22,400	13,440	22,400	58,240
Four	...	...	2,880	28,800	17,280	28,800	74,880
Five	...	...	3,776	37,760	22,656	...	60,416
Six	...	...	4,928	49,280	...	...	49,280
Seven	...	...	6,438 at $6 per head		...	...	38,628
							$364,644
Total product in seven years of 4,000 cows, costing $72,000, including cost of cows							$730,952
The profits or increase, on the seventh year alone would be							254,792

Or fifty per cent on the entire capital of $500,000. Each subsequent year the increase of profits is enormously enhanced.
Each year also, from 3,000 to 5,000 head of steers can be bought, and sold a year later, at a profit of $10 or more per head which item alone would pay double the expenses of the entire ranch.

His estimate is for *seven* years, because a herd is supposed to double in that period. Cattlemen say a herd will double in seven years by natural increase, and during that time enough beef will be sold out of it to pay the expense of running it, and nearly enough more in addition, to cover the original investment. One-twelfth part of a herd is sold for beef annually; and the annual yield of calves will amount to about one-fourth the number of animals in the whole herd. That is, a herd of one thousand animals will amount to two thousand in about seven years. The calves would number about two hundred and fifty the first year, increasing from year to year as the herd grows. The number of cattle sold for beef the first year would be one-twelfth of one thousand, or eighty-three; and this number will increase from year to year. In this way stockmen estimate their material prosperity on paper; but sometimes the paper loses its value by the severity of an unusual winter, the prevalence of cattle disease, or the ravages of grasshoppers. Four-fifths of a herd of cows will bring the owner a calf annually until the cows are twelve years old, if kept so long. A single cow is the mother of one calf at three years of age. At four, she has two, the first a yearling. At five, she is the mother of three calves, the oldest two years. When the mother is six, she has four children and one grandchild, her oldest calf becoming a mother herself. At seven, she has five children, and three grandchildren; for the oldest daughter has her second calf, and the next daughter in age has her first calf. At eight, the grandmother has six children, six grandchildren, and one great-grandchild — the whole family numbering fourteen; for her oldest calf has her third calf, the next in age her second, and the third in age her first, and the first grandcalf has a calf also. At nine, the original cow has seven children, ten grandchildren, and three great-grandchildren; for her oldest calf has her fourth, the second in age her third, the third in age her second, and the fourth in age her first; and the first grandcalf has her second offspring, and the second grandcalf her first. There are twenty in the family now. At ten, the original cow has eight children, fifteen grandchildren, and six great-grandchildren; for her oldest calf has her fifth, the second in age her fourth, the third in age her third, the fourth in age her second, and the fifth in age her first; and the first grandcalf has her third offspring, the second her second, and the third her first — twenty-nine in all. At eleven, the cow has nine children, twenty-one grandchildren, ten great-grandchildren, and one great-great-grandcalf; for her oldest calf has her sixth calf, the next her fifth,

the next her fourth, the next her third, the next her second, and the next her first; and the first grandcalf has her fourth, the next her third, the next her second, and the next her first; and, also, the first great-grandcalf has her first, the fifth generation. Now the family numbers forty-one. At twelve, the maternal ancestor has ten children, twenty-eight grandchildren, fifteen great-grandchildren, and three great-great-grandchildren; for her first calf has her seventh, the next her sixth, the next her fifth, the next her fourth, the next her third, the next her second, and the next her first; and the first grandcalf has her fifth, the next her fourth, the next her third, the next her second, and the next her first; also, the first great-grandcalf has her second, and the next her first — a family of fifty-six. Five generations, — ten of the second, twenty-eight of the third, fifteen of the fourth, and three of the fifth. By this time the mission of the original cow ought to be considered accomplished, and she be allowed to die a natural death, if she will, although it is more probable that, after making herself the source of such a marvellous income to her owner, she will close her earthly career in some busy mining camp where canned corned beef is reckoned as the staff of life.

There is one serious trouble, however, with the foregoing figures. The estimate is based upon the supposition that the cow's progeny are all females. To this date, however, by no artifice or persuasion, have stockmen been able to make their cows bring them all heifers. We have no doubt that they would if they could. This is one of the few things in which cattlemen have been baffled; their cows will bring forth about one-half males, in spite of any coaxing, fixing, or blaspheming. Nevertheless, the foregoing estimate will serve a good purpose, without reflecting at all upon the cow; for, after making due allowance for her male progeny, her family will number about thirty when she is twelve years old; and this ought to satisfy reasonable stockmen, since five thousand cows could show, even at this rate, one hundred and twenty thousand animals in twelve years, though but four-fifths of their number become mothers, provided none die, or are killed. At twenty-five dollars per head, this number would bring three million dollars. The original investment for five thousand cows would not vary much either way from one hundred and fifty thousand dollars.

The Commissioner of Immigration, Whigham, of Colfax County, New Mexico, published the following statement in 1883: —

"The principal industry of the county at present is raising cattle and sheep. The grazing lands of Colfax County are justly cele-

brated, and are unrivalled in any section of the Rocky Mountains. No business has proved a more lucrative one here than stock-raising. There are in Colfax at present, it is estimated, seventy-five thousand head of cattle, two hundred thousand head of sheep, and seven thousand head of horses and brood mares. The following table will not be out of place, as not only giving an estimate of the profits in the cattle business here, — and it is indorsed by cattlemen hereabouts as a fair exhibit, — but will also give current prices of common stock, with which it starts, and the price of the improved also.

"Let us say the stock-raiser makes a purchase in September of a herd composed of the following grade and class: —

Capital Invested in Stock.

150 young cows and calves, at $25	$2,250
100 two-year-old heifers, at $12	1,200
100 two-year-old steers, at $12	1,200
75 yearling heifers, at $7	525
75 yearling steers, at $7	525
10 high grade bulls, at $75	750
	$6,450

Capital Invested in Ranch, etc.

Ranch, corrals, etc.	$250
Horses and equipments	250
	$500

Summary Account for Five Years.

END OF YEAR.	NO. OF STOCK.	VALUE.	SALES THREE-YEAR-OLD STEERS.	EXPENSES.	BANK ACCT.
First	530	$7,140.00	100 at $18.00 = $1,800.00	$680	$1,120
Second	655	8,465.00	75 at 18.00 = 1,350.00	750	600
Third	855	11,200.00	60 at 18.00 = 1,080.00	850	230
Fourth	1,063	14,620.00	100 at 22.50 = 2,250.00	1,100	1,150
Fifth	1,321	18,477.50	130 at 22.50 = 2,925.00	1,500	1,425
Total	...	...	...	...	$4,525

Value of stock	$18,477.50
Value of ranches, horses, etc.	1,000.00
Bank account	4,525.00
	$24,002.50
Capital invested	6,950.00
Profit in five years	$17,052.50

"In the above table we have added five hundred dollars to the value of the ranch, horses, etc., at the end of the five years, which is a low estimate of the money charged to 'expenses' which went for the purchase of additional horses. The increase of cattle has been reckoned at eighty-five per cent, allowing five per cent of loss from natural causes in young stock. The improvement in stock bred from fine bulls has been reckoned at twenty-five per cent."

We met a merchant from Illinois in Southern Colorado who had made an annual visit there for eight successive years. He told me that he saw such a margin for profits in the cattle business on his first visit that he invested all the money he had laid by, though it was but eight hundred dollars. He found a reliable man, engaged in the business in a small way, and entered into partnership with him, with the understanding that he should continue his business in Illinois, making a visit annually to Colorado. "I have just sold out my interest in the herd to my partner for ten thousand dollars," said he, perfectly satisfied with his venture, as he ought to have been. His partner had run the herd, performed all the work; and his investment of eight hundred dollars had grown to ten thousand, while he was trading, eating, and sleeping in Illinois.

On my way home I made the acquaintance of a Massachusetts man, who had become a stock-grower in Nebraska. His story was substantially as follows: "I was a manufacturer in Massachusetts, and four years ago broke down by overwork. My physician gave me no hope of recovery, unless I would give up business, and go West. I sold out everything, and removed to Nebraska, with no intention of doing any business. I had plenty of money, so that I was under no necessity to accumulate more. But I saw at once the profits of cattle-raising, and that the business would oblige me to be in the open air — the best thing for my health. Also I had a rare opportunity to buy out a stockman at low figures, and I embraced it, starting out with a herd of about four thousand. The next season I went to Oregon and purchased five thousand herd, and drove them over the country to my ranch. When they joined my herd at home they were worth double what I paid for them in Oregon. At that time I had invested about one hundred and ten thousand dollars. One month ago," he continued (which was October, 1883), "I was offered three hundred thousand dollars for my herd in cash, and I refused it. I would not sell the herd for five hundred thousand dollars, because in ten years, and in less time than that, it will be worth a million."

A Massachusetts man, whom the writer knows well, bought a ranch eight years ago in Wyoming for which he paid two hundred and thirty thousand dollars, — a very low figure for the size of the herd, — but peculiar circumstances forced the sale. There were twelve thousand cattle and seven hundred horses, with etceteras, on the ranch. The purchase was made in early summer, and in December following we met the owner in Boston, and inquired after his ranch business. He replied: "In October I sold my beef, and since that six thousand head of cattle, the whole amounting to one hundred and eighty thousand dollars. I have six thousand head of cattle and seven hundred horses left, which are worth at least what I paid for the ranch in the first place."

Capitalists of England and Scotland are largely interested in American stock-raising, especially in the New West. It is claimed that in 1882 they invested thirty million dollars in this industry in our country. Taking advantage of our liberal legislation, they have come into possession of immense tracts of land, so that it became necessary to impose barriers to this method of gobbling up our country; and recent legislation has put a stop to this wholesale possession by aliens.

A Scotchman, J. S. Tait, has recently issued a small volume, "The Cattle-Fields of the Far West"; and it may be profitable to learn his estimate of the cattle business. The reader will easily understand his figures by remembering that a pound of English money is equal to five dollars, and a shilling to twenty-five cents in American currency. Mr. Tait says: —

"Under the most onerous of the conditions named, and where the entire pasture has to be purchased at ten shillings per acre, the profits of the cattle trade are quite beyond parallel. In the case of a good-sized herd they may be briefly indicated thus: —

A yearling high grade steer or bullock, costing £3, would realize at the end of the fourth year, that is, within three years of its purchase		£8 0 0
Less prime cost	£3 0 0	
Less cost of maintenance for three years (expenses all told), at 5*s* per annum	0 15 0	
Less three years' interest on cost of five acres of good land	0 7 6	
Less percentage of loss for three years at five per cent per annum (a high estimate)	0 17 6	
		5 0 0
Leaving a net gain for the three years of		£3 0 0

Equivalent to 33⅓ per cent per annum on the original outlay. To this must be added the growth in the value of the land

(which it might certainly be expected would double in value in the same period), equal to a further 33⅓ per cent per annum, or 66½ in all on the average of years.

"Turning to the female cattle:—

A yearling high grade heifer costing £3, would, at the end of its seventh year, realize as a fattened cow		£6 0 0
And would have saved four calves, valued at £2 each.		8 0 0
		£14 0 0
Less prime cost	£3 0 0	
Less cost of maintenance as above for six years at 5*s* per annum .	1 10 0	
Less interest on land, six years	0 15 0	
Less percentage of loss for six years at 7½ per cent per annum (a very high estimate), but the loss is somewhat greater in female cattle	2 9 6	
		7 14 6
Net gain for six years		£6 5 6
Equivalent to an annual dividend of 33⅓ per cent on original outlay, or, including growth in value of land as computed above, 66½ per cent for the year.		

He adds: "This is not the most lucrative aspect of the cattle question, but it is the simplest way of ascertaining the minimum of what a cattle investment will achieve where the herd is of sufficient size and the land owned.

"When the cattle are steadily graded up, still greater results will be attained; and where, in addition, the agricultural capabilities of the soil are utilized to winter-feed the fat steers intended for the early market, this business will readily pay from fifty to sixty per cent per annum, from the cattle alone, in addition to the accumulating value in its land.

"And these immense returns, it will be borne in mind, are reckoned on the entire capital, unrelieved by debentures, the issue of which would, of course, increase the dividend very materially." Mr. P. continues:—

"The Hon. Moreton E. Post, member of Congress, and banker, Cheyenne, informed the writer that Mr. Searight of Wyoming had invested £30,000 in the cattle business of that Territory in 1879, and having taken no money out of the business, nor, on the other hand, put any in since, the property in the fall of 1882 was worth £300,000. The latter valuation the writer knows to be correct, from having handled the property; and as Mr. Post was Searight's banker, he may be relied upon as being correct with regard to the amount

originally put in. The owner confirmed the statement. Colonel Slaughter, President of the First National Bank of Dallas, Texas, considered one of the best authorities on the cattle trade in that State, has made a similar sum (£300,000) in the business, and he has not yet reached middle life.

"Mr. Charles Goodnight (Goodnight & Adair) the Pioneer of the Panhandle, has made (without any original capital of his own) £120,000 in ten years. His partner, Mr. Adair of Rathdairs, Ireland, a gentleman well known in this country, has put from £72,000 to £74,000 into the cattle business in Texas during the last six or seven years, and has taken out from £12,000 to £14,000. The £60,000 representing the balance of his money left in, is now worth £600,000.

"Many more striking instances of great wealth rapidly achieved in the stock-raising industry could be adduced; but, as already explained, the writer is careful to restrict himself to statements which can be readily investigated and confirmed. Messrs. Post, Searight, Slaughter, Goodnight, and Adair may be surpassed in wealth by many of the cattle kings, but they have no superiors in standing and probity; and the facts quoted can quickly be tested by inquiry of any of the cattle salesmen of Chicago, St. Louis, or Kansas City.

"Nor is such prosperity at all abnormal in the cattle trade. Without a moment's hesitation, the writer could name at least two hundred men, with whom he is personally acquainted, who have achieved their twenty, fifty, one hundred, two hundred thousand pounds, and upwards, in this business — starting with nothing whatever of their own, and founding their fortunes originally on the permission granted by their employer to run a few cattle with the herd they managed for him. The cattle towns of America — or towns practically sustained by that industry — are, per head of population, the wealthiest in the world."

Some of the cattle companies operate on a grand scale. A short review of the property of the Prairie Cattle Company, organized with Scotch capital, will give an idea of this. The company's territory lies in three divisions. The first, called the Arkansas, or northern, division, extends from the Arkansas River in Colorado on the north, to the line of Colorado and New Mexico on the south, — 70 miles, — and 60 miles east and west, making a territory of 3,500 square miles, or 2,240,000 acres. There are 53,982 cattle on this range, and 300

horses are used by the cowboys who manage the herd. The value of the land, $163,992; of cattle, $1,705,000; total, $1,791,492.

The second, called the Cimmarron, or Central division, lies in the northern part of New Mexico, extending 84 miles from the Colorado line to the southern line of Mora County, and 48 miles from Sierra Grand on the west to the Texas line on the east, an area of 4,032 square miles, or 2,580,480 acres. The worth of the land is estimated at $235,545; the number of cattle is 57,799, and their worth $1,444,975. The whole value is put at $1,753,920. The management requires 500 horses. This division is the seat of the company's general headquarters, and the greater part of the southern rounding-up is managed from here. A telephone line 150 miles long connects the general headquarters with those of the Northern division.

The Canadian or Southern division is on the Canadian River, in the Panhandle of Texas, in Potter and Oldham counties, the greatest length and breadth being 25 and 16 miles respectively, and the area is 400 square miles, or 256,000 acres. The land is not so good as that of the other divisions, and its cost was 60 cents an acre. The value of the 29,803 cattle is $715,272, and of the 200 horses $8,000, making the entire property worth $771,072. The total value of the three properties, whose joint area is larger than that of Massachusetts, is set at $4,416,484. The company began business with 104,000 cattle, and in two years the number had increased to 139,000, the profits in the meantime making a dividend of $50,000 in 1881, and $250,000 in 1882, in which year about 26,000 calves were branded.

In the Northwest, one of the largest companies is the Powder River of Wyoming, with a capital stock of $1,500,000. It includes among its directors the Duke of Manchester and Lord Henry Neville. The Marquis de Mores, a French nobleman, has a large ranch on the Little Missouri River in Montana, and there he is instituting a new departure in the shape of a slaughtering establishment, killing 80 beeves, or two carloads of dressed meat, a day. The Northern Pacific Refrigerator Car Company, organized in St. Paul with a capital of $200,000, has a ten years' contract with the Northern Pacific Railway, and transports the meat from this place. It is believed that eventually all cattle ready to kill will be slaughtered at the nearest point to the ranches on the railway lines, and the meat shipped East by refrigerator cars, thus saving the greater expense of transporting live stock and the loss on shrinkage, as has already become general with the beef supply from Chicago eastward.

There are larger ranches than the above, it is true. The largest

ranch in the world is near San Antonio, Texas, and was sold by Colonel King, of that state, to a London syndicate, for $4,000,000. A Chicago syndicate, of which C. B. Farwell is a member, own a ranch of 300,000 acres in Texas. The famous Maxwell grant in New Mexico is leased for 38 years by the Maxwell Cattle Company, with a capital of $1,000,000. The ranch contains 1,400,000 acres, and has a capacity of sustaining 80,000 cattle.

THE COWBOY.

The cowboy plays such an important part in the cattle business that we stop here to tell the reader about him. You have heard much about him, but little that is true. So incorrect are the representations of him in the Eastern States that the reader will be surprised to learn from the photograph that the cowboy is a member of the human family.

A COWBOY.

We assure the reader that this is a photograph of a real cowboy, whom we have seen and conversed with, and from whom we begged the photo. He has been in the business since he was twelve years of age, and, of course, is a veteran cowboy although he is not over thirty years old. He has lived most of his life just outside of civilization, and scoured the "Great Plains," and penetrated the Rockies, so thoroughly, that he is more at home there than he is in Denver or Greeley. He is a real dare-devil on the round-up, and the wildest broncho cannot run faster than he can ride. He sticks to his back, too, except when the flying brute stumbles when on

the dead run; and then, of course, he falls with him. In this way he has learned what it is to have a broken arm, a dislocated shoulder, fractured ribs, sprained ankles, and bruises without number; but he was easily mended, and is now as good as new. He has been picked up for dead several times, when horse and rider went down together in their chase after a wild steer; and no one could tell why he was not killed, except that his time had not come. And yet this daring cowboy, so familiar with "life on the plains," his life as wild as the cattle which he herded, actually went into a civilized community, courted and married a modest, good girl, and established a home.

COWBOY OFF FOR THE RANGE.

If her ideas of a cowboy, and those of her neighbors, had been like those of many Eastern people, she would have run away from him when he went to make love, expecting a bullet from a revolver, instead of an arrow from Cupid. The photograph shows him, of course, as he appears at home in citizen's dress.

This cut represents a cowboy starting for the range, equipped for the service, his lariat hanging upon the horn of his saddle.

People in the New West laugh at the prevalent ideas of the cowboy in the East. When a town is sacked, or a railroad train robbed by masked men, it is heralded throughout the Eastern States as the crime of cowboys, when more likely a gang of professionals from New York or Chicago perpetrated the deed. That there are bad cowboys must be admitted; but, as a class, they are not the desperadoes and cut-throats which many Eastern papers represent them to be. We have seen cowboys who were educated in the best warehouses of Boston, and were told of others who were graduated at

Harvard and Yale. They were in search of health, and engaged in this business, first, for health, and, second, for a fortune. That we may not be charged with giving a rose-colored view of this class, we call attention to the sentiments of others, whose opportunities of personal observation have been far better than ours.

The editor of the *West Shore*, published at Portland, Ore., has the following: —

"The idea entertained of the cowboy by the Eastern public is as erroneous as it is possible to be. The cowboys, as a class, are a brave, intelligent, honorable, kind-hearted, and cool-headed class of men. In their ranks will be found college graduates, sons of many of the first families of the East, men worth their thousands in their own right, scions of nobility from Europe, and natives of the plains and mountains, the last, of course, by far the most numerous. That their life of freedom from restraint should develop certain wild traits of character, or that among them should drift an occasional refugee from justice, is not surprising; but such a recruit must behave himself like a man, and should he commit any outrage or crime, his companions would be the first to see that he was properly punished. They have no great love for Indians, nor, for that matter, has any man who has been brought into contact with that lazy, pilfering, ignoble race; and if they occasionally have trouble with Mr. Lo, the blame is by no means entirely their own. No better description of them and their characteristics can be given than the following by a cattleman, who has lived and worked with them for years: —

"'The cowboy is the most thoroughly misunderstood man, outside of the localities where he is known, on the face of the earth. I know him in all his alleged terrors, and as a class there are no nobler-hearted or honorable men in the world. Brave to rashness and generous to a fault, if you should be thrown among them you would find them ever ready to share their last crust with you, or lie down at night with you on the same blanket. Say that I have ten thousand cattle which I am about to send overland from Texas into Montana to fatten for the market. Those cattle will be on the drive from the first of April until the middle of September. They are divided into three herds, with a dozen or sixteen men with each herd. I intrust those cattle in the hands of a gang of cowboys. For six months I know absolutely nothing of my stock. I trust their honesty to the extent of many thousands of dollars, without a contract, without a bond, with no earthly hold upon them, legally or morally, beyond the fact that I am paying them thirty-five or forty dollars a month

to protect my interests. And these are the men pictured in the East as outcasts of civilization! I trust absolutely to their judgment in getting those cattle through a wild and unbroken country without loss or injury. I trust as absolutely to their bravery and endurance in the face of danger, for a man to be a cowboy must be a brave man. For instance, we are on a drive. The cattle are as wild as deers naturally, and being in an unknown country are as nervous and timid as sheep. The slightest noise may startle them into a stampede. We have been on the drive all day, and night is coming on. It is cold and raining. We have reached the point where we intend to round up for the night. The men commence to ride around the drove, singing, shouting, and whistling to encourage the animals by the sounds they are familiar with and to drown any noise of an unusual character which might provoke a stampede. Round and round the cattle they ride, until the whole drove is travelling in a circle. Slowly the cowboys close in on them, still shouting and singing, until finally the cattle become quiet, and after a time lie down and commence chewing their cuds with apparent contentment. Still the vigilance of the men cannot be relaxed. At least half of them must continue riding about the resting herd all night. A stampede of cattle is a terrible thing to the cowboys, and may be brought on by the most trivial cause. These wild cattle away from homes are as variable as the wind, and when frightened are as irresistible as an avalanche. The slightest noise of an unusual nature, the barking of a coyote, the snap of a pistol, the crackling of a twig, will bring some wild-eyed steer to his feet in terror. Another instant and the whole drove are panting and bellowing in the wildest fear. They are ready to follow the lead of any animal that makes a break. Then the coolness and self-possession of the cowboy are called into play. They still continue their wild gallop around the frightened drove, endeavoring to reassure them and get them quiet once more. Maybe they will succeed after an hour or two, and the animals will again be at rest. But the chances are that they cannot be quieted so easily. A break is made in some direction. Here comes the heroism of the cowboy. Those cattle are as blind and unreasoning in their flight as a pair of runaway horses. They know no danger but from behind, and if they did, could not stop for the surging sea of maddened animals in the rear. A rocky gorge or deep-cut cañon may cause the loss of half their number. Those in the rear cannot see the danger, and the leaders cannot stop for those behind and are pushed on to their death. A precipice may lie in their way, over

which they plunge to destruction. It matters not to the cowboy. If the stampede is made, the captain of the drove and his men ride until they head it, and then endeavor to turn the animals in a circle once more. A hole in the ground, which catches a horse's foot, a stumble, and the hoofs of three thousand cattle have trampled the semblance of humanity from him. He knows this. A gulch or gorge lies in their path. There is no escaping it. There is no turning to

DEATH OF A HERO.

the right or the left, and in an instant horse and rider are at the bottom, buried under a thousand cattle. History records no instance of more unquestioning performance of duty in the presence of danger than is done by these men on every drive. Should the stampede be stopped, there is no rest for the drivers that night, but the utmost vigilance is required to prevent a recurrence of the break from the frightened cattle. This may happen hundreds of times on a single drive.

"'I remember one instance which, from the friendship in which

I held the victim, has made a lasting impression on me. Two brothers were together on the drive. Both men had been educated in an Eastern college, but for some reason had drifted to the cattle plains of Texas and had become cowboys. The elder was the captain of the drive. Sitting about the camp-fire one night the younger was very down-hearted about something, and finally said: "Charlie, let's throw up this drive. I don't want to go; I feel that one or the other of us will never go back. I am ashamed of this, but I cannot shake it off." His brother was impressed by his seriousness, but could only say: "George, here are three thousand cattle in my charge. I could not leave them if I knew that I would be killed to-morrow." "A stampede!" cried one of the men. In an instant they were all at their animals, saddles were adjusted, and away they went. The captain gained the head of the drive, and had succeeded in turning them a little when his horse stumbled. In another instant horse and rider could hardly have been distinguished from one another. This is the class of men cowboys are made of, and I never knew of many instances where they failed to do their duty.

"'There is another interesting period in the life of the cowboy, and that is the spring round-up. In the fall the cattle stray away, and in working away from the storms they sometimes get away a hundred miles or so. Each cattle-owner has his own particular brand on his cattle. The ranchmen in some natural division of the country will organize a grand round-up in the spring. The cowboys will drive the cattle all in together in one big drove. Then the captain of the round-up will direct the owner of ranch A to "cut" out his cattle. One of A's most experienced men will then ride into the drive until he sights an animal with his brand on. Deftly he will drive the animal to the outer edge of the herd, and then with a quick dash, run the beast out away from the drove, and it is taken in charge by others of A's ranchmen, while the cutter goes back after another. After some fifteen or twenty minutes, A's cutter will be taken off and B's man given a chance. This will be continued until each ranch has its cattle cut out. If any cattle are found without a brand, they are killed for the use of the men on the round-up. This cutting is a work requiring great skill and experience, and frequently requires the use of the lariat. Often cattle with a strange brand are found. If any one recognizes the brand, a ranchman living nearest the owner takes charge of it and notifies the owner. If no one recognizes the brand, the captain of the round-up advertises it,

and if no owner is found, it is sold at auction for the benefit of the Cattlemen's Association.

"'These things will go to show the responsibilities resting upon these men. I will tell you how they get the reputation for recklessness. We will suppose these men have been on a drive for six months and been paid off. Then they are just like any other body of men; they go in for some fun, and on their lark ride yelling through the streets of some little town, shoot a few street lamps out, or get into a saloon row. Some imaginative correspondent immediately sends an account of it to some Eastern paper, where it comes out headed "Another Cowboy Outrage." Now, I know of hundreds of cowboys who never carry a revolver. They have strict ideas of honor, and they stand upon their honor. They are off duty, a lot of big-hearted, rough boys, but they are not outlaws or outcasts. They are not the class of men who rob trains or hold up people crossing the plains, and I believe that, taken for all in all, the American cowboy will compare favorably in morals and manners with any similar number of citizens, taken as a class.'"

A traveller in the West, writing to the *Chicago Herald*, describes the heroic conduct of a cowboy as follows: —

"One of the slickest things I ever saw in my travels, was a cowboy stopping a cattle stampede. A herd of six or eight hundred had got frightened at something and broke away pell-mell, with their tails in the air, and the bulls at the head of the procession. But Mr. Cowboy didn't get excited at all when he saw the herd was going straight for a high bluff, where they would certainly tumble down into the cañon and be killed. You know that when a herd like that gets to going they can't stop, no matter whether they rush to death or not. Those in the rear crowd those ahead, and away they go. I wouldn't have given a dollar a head for that herd, but the cowboy spurred up his mustang, made a little detour, came in right in front of the herd, cut across their path at a right angle, and then galloped leisurely on to the edge of that bluff, halted, and looked around at that wild mass of beef coming right toward him. He was as cool as a cucumber, though I expected to see him killed, and was so excited I could not speak. Well, sir, when the leaders had got within about a quarter of a mile of him I saw them try to slack up, though they could not do it very quick. But the whole herd seemed to want to stop, and when the cows and steers in the rear got about where the cowboy had cut across their path, I was surprised to see them stop and commence to nibble at the grass. Then the whole herd stopped,

wheeled, straggled back, and went to fighting for a chance to eat where the rear guard was.

"You see that cowboy had opened a big bag of salt he had brought out from the ranch to give the cattle, galloped across the herd's course and emptied the bag. Every animal sniffed that line of salt, and, of course, that broke up the stampede. But, I tell you, it was a queer sight to see that fellow out there on the edge of that bluff quietly rolling a cigarette, when it seemed as if he'd be lying under two hundred tons of beef in about a minute and a half."

STOPPING A STAMPEDE.

THE "ROUND-UP."

We have said that, from November to May, cattle wander where they please for food. Cowboys bestow no special care upon them, except occasionally, after a severe storm, or during an unusually cold winter, they go out to find how it is with the herd.

About the twentieth of May, however, the "round-up" begins.

All the cattlemen in the district (the grazing country is divided into districts, under the control of necessary laws) meet at a given place, each owner of a herd furnishing a given number of cowboys and horses, according to the size of his herd; an organization is formed by the choice of captain and other necessary officers; and the exciting and fascinating business begins. The cowboys, upon their well-trained bronchos, sweep over the country, searching for and surrounding the scattered cattle, driving them towards an appointed locality, where, each day, each stockman "cuts out" his own cattle, brands the calves, guards them at night, and drives them on the

GROUP OF COWBOYS.

following day to another fixed locality, and thus on, until the home ranch is reached, when they are again turned loose.

Many of the steers are wild as buffaloes, and often start off into a dead run just where the cowboys object to their going, and it is a neck and neck race often for miles, or until the wild creatures are exhausted. Here the excitement, as well as the dangers of the business, come in. Sometimes a wild bull will turn upon his pursuer in a frenzy of madness, and the cowboy has but one thing to do — he must turn from the enraged animal and run for dear life. Neither horse nor rider can wage successful warfare with a mad bull. Horses are trained so thoroughly to the business that they voluntarily chase a steer when it is necessary, but run from him when that appears advisable.

A writer in the *Boston Commercial Bulletin* describes his participation in a round-up in Colorado, from which we make a few extracts:—

"All in a moment the earth seemed fairly sprouting with cattle, as they suddenly sprang into sight on all sides, the insatiate curiosity of the animals drawing them from miles across the country to take a good look at us. Breathing hard with excitement, they would stand viewing us with eyes large from fright and defiance, until as we started for them away they would go, bellowing wildly and with a noise as of hundreds of beaten drums from the falling hoofs.

THE "ROUND-UP."

"And wildly exciting was the chase, our aims quite marvellously aided by the excellence of our ponies, who it would seem might almost have accomplished the task themselves. The perceptions of a trained cow-horse become marvellously acute. Guided by the smallest twitch on the reins, he seems to divine by a subtle instinct the will of the rider. Out of a large herd the horse will seem to comprehend at once what cattle are to be cut out, sighting an animal apparently at the same instant with his rider, and seeming to take a

diabolical sort of delight in running the creature down and frustrating all its clumsy, contrary efforts to run the wrong way.

* * * * * * * *

"When a cowboy leaves his outfit to join any other, or for an expedition of any kind, he always takes his 'string' of horses, generally five or six, as well as all of his personal property, along with him. The tarpaulin — always pronounced as if spelled *tarpaulion*, and we will therefore henceforth so call it — and the blankets, comprising his bed, are wrapped around the gentlest of his horses and made fast with a lariat in a good 'squaw hitch'; on top of this the precious war-sack is fastened with especial care, and thus, driving his horses ahead of him, with all his earthly responsibilities directly before his eyes, the cowboy sallies forth. He gets his 'grub' at any ranch he may come to until he joins another grub wagon, and unrolls his bed on the ground wherever night overtakes him, corralling his horses if he is so lucky as to find a corral, otherwise hobbling them, that is, tying the forelegs together with a bit of rope. One horse, however, ready for immediate use, he always stakes."

STARTING A LAUNDRY.

"There were a few posts to be replanted at this point; but, for the most part, we had little to do, and we improved the leisure by establishing a little impromptu laundry by the river side. Our process was very simple. Wetting the garments thoroughly, we laid them out on the bank, rubbing them well over with soap; we then scrubbed and slapped each piece vigorously between our hands, when we rinsed them well, wrung them out, spread them on the grass, and, lighting pipes, stretched our exhausted selves out beside them, keeping a lazy oversight on the drying. Some, more energetically ingenious, tied their clothes in a bunch to the end of a lariat, and, throwing them out in the stream, towed them up a piece against the current; but, beyond its interesting eccentricity, there was little to be said in favor of this method.

"The river comprised our entire toilet facilities, barring the hard soap on the grub wagon; and we were wont to seize upon every opportunity for a bath and a swim in its murky waters."

* * * * * * * *

"The ideas of roughness and exposure suggested by sleeping out are not sustained by the facts in the cowboy's case, as in the tarpaulion properly folded he sleeps as warmly and comfortably as in a

tent. The method of his bed-making is not without art of its own. He first spreads out his tarpaulion on the ground. On the middle, at one end, a few inches below the edge, widthwise, his blankets, each folded once through the middle, are laid; his war-sack is arranged for a pillow, and then the tarpaulion is folded over the blankets on either side, making a sausage-like roll of the canvas

STARTING A LAUNDRY.

some two feet wide, and the full sixteen feet long. Going to the foot then he makes a last fold just below his blankets, drawing the extra length well up over his pillow, where it will extend a couple of feet, forming ample shelter from rain.

"When one crawls into bed he first throws back the top folds of the tarpaulion, drawing it out a little wider than the bed beneath; then boots, hat, chaparrals, and other garments are arranged above the pillow, and he gently insinuates himself down between the

blankets, pulling the extra length of canvas up over his head. If the wind blows hard, he reaches up and tucks the loose canvas well under his head, his covering presenting a smooth surface to the weather, and his body acting as a water-shed, so that he can sleep in warm security through the heaviest storm. With the blankets properly folded inside the tarpaulion, the whole is rolled up into a huge roly-poly package during the day, going on the grub wagon when the camp moves; and but a few minutes suffices at night for the cowboy to 'roll down' his bed, and establish himself in what his hard day's work has taught him to regard as sufficient luxury.

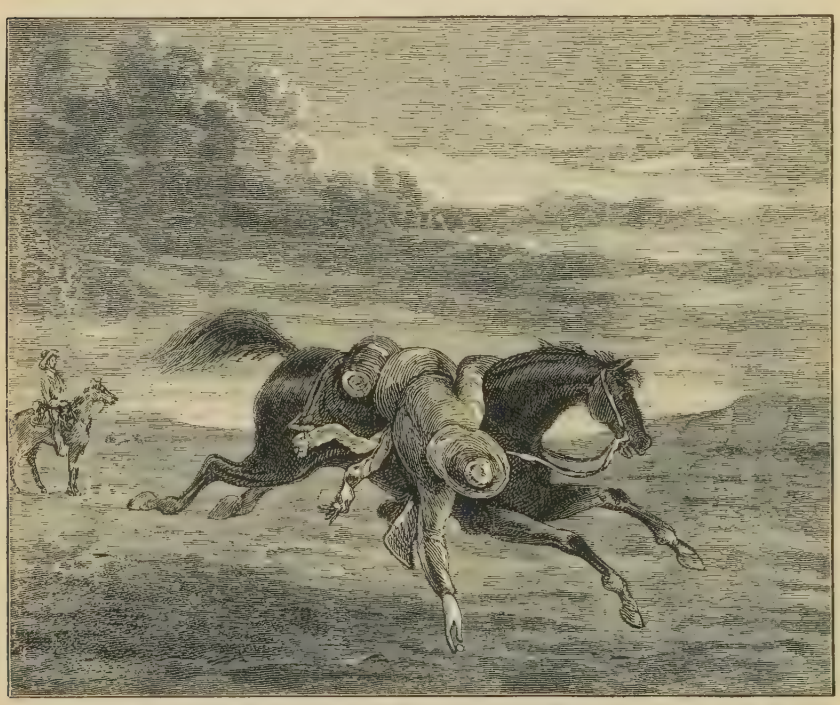
"In getting started, a young lad, who had just joined the outfit at Sterling, having a bucking horse of extreme viciousness, was thrown twice, once landing safely on his feet, but the next time striking on his head with terrible force. As the poor boy — he was no more than fourteen years old — staggered to his feet, sick and dizzy, to try it again, I took pity on him, and, riding out to the herd, roped up a fresh horse, while one of the other boys hastily helped me to shift the lad's saddle and help him on in good shape. Had he been a few years older, nobody would have dreamed of interfering, nor should I have ventured to do it even then had I seen the foreman about. He was on hand, however; and his wrath at my irregularity of friendliness was prompt and outspoken, evidently increasing the unreasoning hostility with which he had all along regarded me.

"Cowboys generally are skilled horsemen, many of them expert 'broncho-breakers,' really capable of sustaining the common boast of being 'able to ride anything that wears hair.' Some of their fancy riding, picking up coins and blossoms from the ground while going at full speed, and other feats of a similar nature, are wonderfully graceful. For these tricks, however, the horse, as well as the rider, must be trained, an undisciplined horse always stopping when one leans low from the saddle, which is likely to throw the rider from the force of inertia. A favorite feat of the cowboy broncho-breaker, and one by no means easy, is to place silver dollars in his stirrups, — when he can get together so much wealth, — and back himself to hold the coins in place while he rides his horse at full speed, instigating him to buck as much as possible."

The reader will find much additional information about the round-up from the following description by a Kansas ranchman: —

"This part of the country is drained by a number of rivers which all flow, roughly speaking, in a southeasterly direction. Between the rivers are 'divides,' that is, tracts of land more or less elevated,

and from them small streams or 'creeks' run down, at various distances from each other, to the rivers. Let us suppose that we are going to round up a certain section of country. Some point is fixed on the river that runs through that section, at which to commence work. Every one likely to have any cattle in that neighborhood sends one or more representatives, according to the number he expects to find. The smaller owners club together and fit out a wagon with provisions, so that there may be with one wagon six or eight



PICKING UP A COIN.

men representing as many different brands. The big men, who expect to find perhaps one thousand head, send a wagon of their own, with five or six riders. We will suppose the meeting-point about thirty miles from our camp. About two days before the time fixed for beginning work we load a wagon with provisions, according to the number of men who go with it, and the probable time of their absence. Each man puts in his own roll of blankets. A driver is provided, who has also to act as cook. Each of the riders is provided with several horses, the usual allowance being about five to a man. A horse-herder is generally taken, whose sole duty is to look after

the loose horses. When we are ready we make our start, driving the loose horses before us.

"In the middle of the day we camp for dinner, and probably wish to change our horses. To effect this, a couple of ropes are stretched from the wheels of the wagon, a man holding the end of each, so as to form an angle into which the horses are driven. The men stand behind the horses to prevent them from getting out at the open side of the triangle, each armed with a lariat, which he throws over the head of the particular animal he wishes to ride, and pulls him out of the herd. When every one has caught his horse, the remainder are

GRUB WAGON FOR THE "ROUND-UP."

turned loose again to graze, until it is time to go on. At night we camp beside a stream, if we can find one, and in order to prevent the horses from straying, we round them up again, and hobble them by tying a short rope to the forelegs of each. A couple of horses are picketed out, with which to get up the others in the morning. The following morning, at daybreak, the cook is up and gets breakfast for us, while two of the men go to hunt up the horses, unhobble them, and drive them back to the wagon. After breakfast the wagon is reloaded with the bedding and cooking utensils, and we proceed on our journey. On reaching our destination that evening, we see wagons dotted about in every spot convenient for camping, while hundreds of horses are grazing about in herds, averaging, perhaps,

fifty or sixty head. The men are for the most part lounging round their camp-fires, discussing cattle, bragging of the speed of their horses, or describing the various brands of which they are in search.

"The next morning we are early astir. The 'boss' of the range we are on comes along and tells us what he wants us to do. We are to work perhaps two creeks that morning. A party is sent up to the head of each creek to drive the cattle down to the mouth, while a third rounds up the cattle along the river. Our party is split up so that two or three may be present at each round-up, and as the men with our wagon are all well acquainted with each other's brands, we arrange to cut any cattle belonging to any of our party wherever we may find them. The detachments that are to work the creeks extend themselves on the way up, and throw on to the creeks all the cattle grazing in their neighborhood. When we get to the head water of our creek, which may be about five miles long, we bring in any cattle we can find on the divide, and then our whole party ride down, pushing all the cattle before them nearly to the river; and wherever we find a convenient level, we round them up, the men posting themselves round the herd, which contains perhaps seven or eight hundred head, to prevent them from breaking away. Then the work of cutting out begins. The boss of the range has appointed two of his men to help to hold the herd, and also to prevent everybody from rushing in, as soon as the cattle are rounded up, and 'ginning them around,' as he would call it, so that no one can work properly, and the calves all get separated from their mothers, making it impossible to tell to whom they belong. As soon as the cattle have quieted down, the word is given that one man from each outfit may go in and cut out. One of our party goes in, and wherever he sees an animal bearing one of our brands he runs it out, continuing until we have collected a little bunch of cattle, which a second man herds, to prevent them from straying off and mixing with the other 'cuts.' When we have got out all our cattle we drive them off towards our wagon. In the meantime two other round-ups have been proceeding, and our 'cuts' from them are brought along and all thrown together, forming the nucleus of what we call our 'day-herd' . . .

"A horse that knows what is wanted goes quietly through the herd while you are looking for your brand; then, when you have singled out your animal and urged her on gently to the edge of the herd, he perceives at once which is the one to be ejected. When you have got her close to the edge, you make a little rush behind her,

and she runs out; but as likely as not, as soon as she finds herself outside the herd she tries to get back again, and makes a sudden wheel to the left to get past you. Instantly your horse turns to the left, and runs along between her and the herd so that she cannot get in. Then she tries to dodge in behind you. The moment she turns, your horse stops and wheels round again, always keeping between the cow and the herd, till she gives it up and runs out to the cut where you want her. A good cutting horse will do all this with the reins lying loose upon his neck.

"But it is time to get our dinner. When that is over, we tell the cook to take the wagon up the river about six miles, and there camp.

PREPARING FOR THE NIGHT-HERD.

Two of our party are told off to follow with the day-herd, and the rest of us attend a couple more round-ups that take place in the afternoon. That night we picket out a horse apiece, as we have to herd our cattle. The leader of the party divides the night into so many reliefs, and tell each man at what hour he has to go 'on herd.' The next day we work on up the river in the same way, and so on *de die in diem* till we have rounded up all the cattle in that section of the country.

"If our day-herd becomes unwieldy in size, we despatch it to the range with a couple of men, and commence a fresh herd. Notwithstanding all our care, some cattle are sure to be left behind. A certain number have probably escaped being rounded up. A few we

have accidentally missed, even when they were in the round-up, and some calves were not to be found, so that we have left the cows behind to hunt them up. In a few weeks, therefore, we shall work over the same ground again, and then we shall get nearly everything that we left behind on the first occasion."

The same writer furnishes an incident showing how readily cattle learn : —

"The cattle were so well acquainted with my movable shanty that they felt quite at home near it. They had a very annoying habit of getting up early in the morning, just as one was enjoying his final and sweetest nap, and rubbing their foreheads against the corners of the house, every now and then bringing their horns with a bang against the sides. When we moved down on Big Sandy, we had to wait two or three days before we could get a man to haul down the shanty, so we bedded the cattle on the opposite side of the creek to that on which we intended to station the house, in order that they might get into the habit of sleeping a little way off from it ; but the very first night after it arrived they all with one consent moved across the creek and bedded themselves close beside it."

A ranchman relates the following incident illustrative of the perilous experience of cattle-driving : —

"One is not ordinarily much troubled by insomnia when cattle driving, but I had a bad nightmare one night, which was not imaginary, but came in the shape of a real cow. I had taken the first relief at night-herding, and when my time was up, and I had called the next man, I lay down near the herd and was soon unconscious of all around. While I was enjoying my peaceful slumbers, an old brute of a cow came grazing in my direction, and as soon as she saw the herder coming round to turn her in, she started to run. When she came to where I was lying, she planted her foot on my chest, having scraped my lip with her hoof, and she then stepped on the leg of one of the boys, who was sleeping beside me, who awoke with a fearful yell, exclaiming that his leg was broken ! For a few minutes I felt doubtful whether I was half killed or not, but finally came to the conclusion that I was not much damaged, and, my neighbor seeming also to perceive that this first rash statement respecting his leg was untenable, we soon resigned ourselves again to the arms of Morpheus."

A stockman from whom we have already quoted describes the horses chiefly used, thus : —

"They are for the most part bred in Texas, and are exactly suited

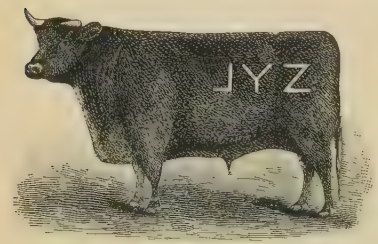
to the work required of them. They are generally small, but remarkably tough. A man does not think anything of catching up one from grass and riding him forty or fifty miles in a day. They are never given any corn during the summer, and, if at the beginning of winter they are turned loose in fair condition, they will hold their own on the grass, and fatten up very fast as soon as the green grass comes in the spring. Those that are used in the winter require some grain. Notwithstanding their small size, they are up to considerable weight. The Mexican saddle in general use weighs from thirty to forty pounds, and on top of that you may sometimes see a man of fourteen or fifteen stone.[1] In point of temper they vary considerably. Some are as docile as could be wished, while a good many are addicted to 'bucking.' When a horse bucks he puts his head down between his legs, arches his back like an angry cat, and springs into the air with all his legs at once, coming down again with a frightful jar, and he sometimes keeps on repeating the performance until he is completely worn out with the excursion. The rider is apt to feel rather worn out too by that time, if he has kept his seat, which is not a very easy matter, especially if the horse is a real scientific bucker, and puts a kind of side action into every jump. The double girth commonly attached to these Mexican saddles is useful for keeping the saddle in its place during one of those bouts, but there is no doubt that they frequently make a horse buck who would not do so with a single girth. With some animals you can never draw up the flank girth without setting them bucking. . . . A really

A BUCKING HORSE.

[1] A "stone" in Great Britain is fourteen pounds.

good Texas cow-pony, when broken, is worth from sixty to seventy dollars. The common sort can be had for half that price."

When the cattle of a district are all collected, the work of "cutting out" the cattle of each owner begins. It is an exciting and interesting feature of the round-up. Each owner has his brand, which is properly recorded at a State office; and his cowboys, skilled in the business, separate his cattle from the herd one by one. The cowboys not engaged in cutting out surround the herd and keep them together. The illustration shows the present style of branding cattle.



CATTLE BRAND.

This brand is taken from the book of brands published by the "Wyoming Stock-Growers' Association." The book contains the brand employed by every member of the association. Other kindred associations employ the same method, so that all the brands of the country are known, and to whom they belong. Under this arrangement the loss of cattle by straying, theft, or false claim is small.

Branding cattle is cruelty. The above brands are burned into the hide with red-hot iron. The cruelty of the method has prompted cattlemen to seek some better way to mark their property. But as yet, no method has been discovered that meets the conditions of ranch life so well as this. There is no doubt that some other way of marking cattle will be discovered, superseding the present cruel method.

The cowboy fastens his eyes upon an animal wearing his employer's brand, and then proceeds to separate it from the herd. It is not so long and difficult a job as might at first appear, though often an exciting race and hard tussle transpires. Calves, of course, will follow their mothers, and the mothers will not leave their calves for much of a run. An eye-witness says of this part of the round-up: —

"Experienced cowboys ride in among the cattle, and, selecting the animals bearing their employer's brand, drive them out of the general herd and form others, each composed of cattle representing one ownership. This work is called 'cutting out.' The men not engaged in cutting out are employed in 'holding' the herds. The foreman of the round-up has supervision of the work, and sees that cattle are claimed only by the men entitled to them.

"When cutting out has been finished at one general herd, another is 'worked' in the same manner, and then another, and so on, until all the cattle driven in during the day's round-up have been inspected and separated.

"When the cowboys have taken from the herds all the cattle belonging to their respective employers, there are usually a few cattle left over. These are estrays and mavericks. Both classes are disposed of under regulations of the association.

"Stray animals whose owners are unknown, and which are of a marketable weight, are taken up, shipped, and marketed. A report of the fact is made to an association inspector, and the proceeds are

ROPING AND CUTTING OUT.

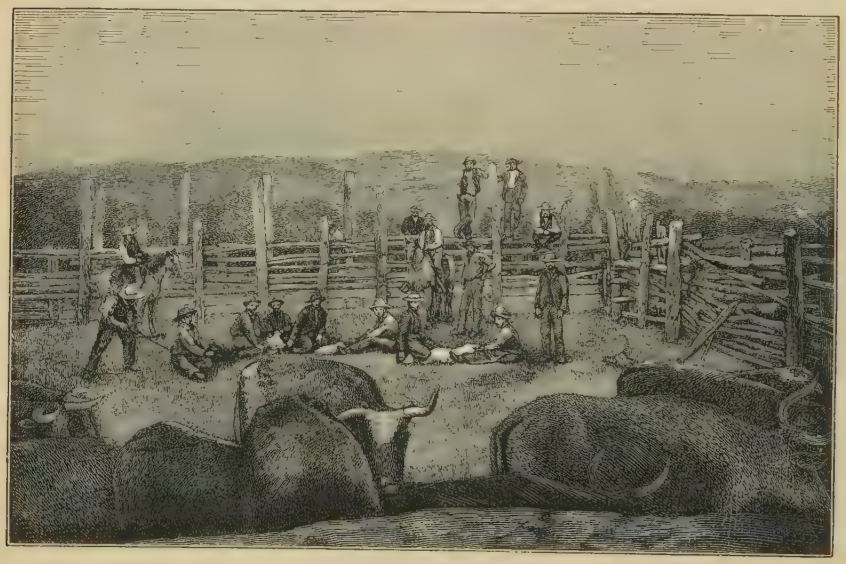
remitted to the secretary of the association, who keeps an account of the money for the purpose of turning it over to the owner of the estrays, should he be found. But if by the time of the next annual meeting no one has claimed the purchase money, it becomes part of the general fund of the association.

"A 'maverick' is an unbranded calf away from its mother. The custom among stockmen, recognized by the rules of the association, is to brand a maverick found on the general round-up with the mark belonging to the largest female herd in the neighborhood."

Branding calves follows 'cutting out,' which requires the services of four men. While calves are expected to stick to their mothers, they are so wild and nimble that often the cowboy has a race after them. A strapping great cowboy on his horse, chasing one of these

diminutive little creatures has been the occasion of much loud laughter that is comical indeed. Mr. Keyes, speaking from personal observation, says: —

"Perhaps you may think that this is an easy task; but you would find if you tried it that you were never more mistaken in your life, for the ease with which the rancheros accomplish it has only come with careful training and long practice. The little animal runs wonderfully fast, springs, turns, and dodges almost like a flash. But the cowboy never takes his eyes off of him; and the trained horse, now well warmed up, and entering fully into the spirit of the chase,



BRANDING CALVES.

responds to, almost seems to anticipate, every turn of his rider's left hand and wrist. Meanwhile the latter, with his right arm, is swinging his noosed rope, or lasso; and in another minute he has thrown it exactly over the calf's head. Instantly the horse plunges forward, giving 'slack' to the rope, and allowing it to be wound around the horn of the saddle; then he moves on, dragging the calf after him, and the little creature is soon in the hands of the men with the branding-irons. These have been heated in a hot fire, and are quickly applied; and in a few minutes, the calf, now indelibly designated as the property of his master, is again running about."

After the general round-up in summer, there follows the beef round-up, collecting cattle which are in a good condition for the

market. This occurs in August and September, so that the beeves can be sent to market in October. This is the most interesting part of the whole year to the stockman; for he learns at this time what his profits are. His object in raising cattle is to make money, appeasing the hunger of his fellow-men being only incidental to his business. Hence, he is happy when his beef from a herd of two

CHASING A CALF.

thousand returns him seven or eight thousand dollars; or his herd of three thousand returns him ten thousand dollars for beef; or his herd of twelve thousand animals returns him forty or fifty thousand dollars; or his herd of twenty-five thousand returns a round one hundred thousand dollars for beef. Such returns are in perfect harmony with the genial days of October; and no wonder the stockman is "contented with all the world, and all the world with him."

But his fat cattle must be sent by rail to market, probably to

Kansas City or Chicago. He may be twelve or fifteen hundred miles away from his market; and it is no small job to transport cattle that distance, many of them as wild as beasts of prey.

The herd may be many miles from the railroad — twenty-five, one hundred miles, or even more. They must be driven over this distance, subject, in some localities, to the driving snow-storms of the season, in which man and beast suffer seriously. Full as much care and watch must be bestowed upon them at night as through the day. But they reach the railroad station, where suitable corrals are found in which to enclose them until freight-cars appear. We have known a stockman to wait thirteen days in a storm of snow and sleet for the expected cars, man and beast suffering intensely night and day.

The following description of a "night run" of cattle in Montana, going to the railroad, will furnish the reader with additional ideas about the cowboy's trials: —

"A large herd of big steers for market were being driven across the country from Musselshell to Billings, on the Northern Pacific Railroad, where they were to be shipped on the cars for Chicago. There were about two thousand head, I should judge, the property of a Mr. De Hass, a very young man. One evening a military camp had been made just ahead of the cattle, and on the same side of the creek with them, up which the cattle were being driven. A storm was coming up, and the cattle exhibited some signs of uneasiness. Mr. De Hass sent word to the military officer that he had better get his men, wagons, and animals on the opposite side of the creek and out of the way, as he feared there was going to be a "night run." The herders were instructed to keep their horses saddled and be ready to mount at a moment's notice. The cattle were very uneasy, getting up, lying down again, and shifting about as if uncomfortable. At last, about midnight, there came a sharp flash of lightning, followed by a heavy peal of thunder, and in an instant the whole herd were upon their feet. 'Mount and whip out,' cried De Hass, and the herder who was at the head of the column drove off a few of the leading steers in the direction they were to go. All the others followed, and the herd was soon in full flight. The herders made no effort to check or control them, further than to keep them going straight; they rode at the head of the column, one on each side of them, swung to the right or left, and keeping the trail; bluffs and precipices were avoided, and the open flat ground courted. The run lasted about two hours, when a gorge was being neared, in which the

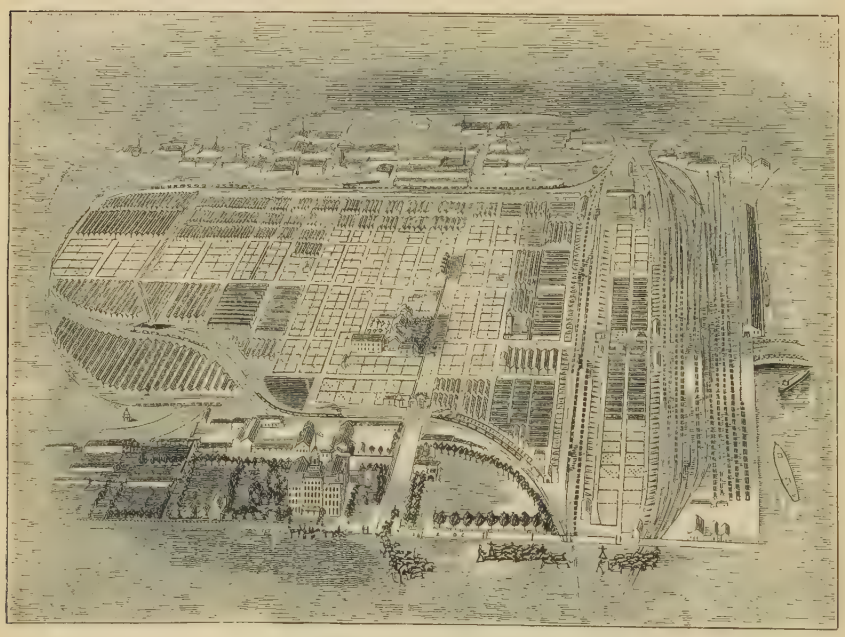
cattle would crowd and break their limbs. They were now quite tired, and the herders determined to exert their authority and stop the run. The head of the column was bent out on the prairie, and circled round and round until the cattle became tied up in a huge ball and could not move at all. In this way they were obliged to stay till morning, the herders riding round and round them, and keeping them completely tied up. At daylight they were allowed to "open out." First, the outer edge scattered, and then layer after layer, until the huge pile of beef was once more a herd, grazing as quietly as if nothing had happened."

When the train arrives, the cowboys meet a very difficult problem to solve; viz., putting the cattle on board the cars. Think of enticing or driving a wild steer into a car! The average steer is not drawn naturally toward a railroad train. To him the car is a "new-fangled notion," which has no attractions for him. He protests against such a mode of conveyance, and sets up his Ebenezer, as wild steers only can. But the cowboys know their business, and they know their steers, too. Brute force always surrenders to intellectual power. The cowboy conquers in the end.

It is hard work — indeed, the whole cattle business is hard work; and the boys never have harder work than they do between the time of herding the cattle, and delivering them at Kansas City or Chicago. For the cattle must not be allowed to lie down. A car will hold from eighteen to twenty-two animals, in the standing posture; and, if one lies down, the cowboy, on the alert both night and day, must punch the animal up. If one lies down, others will trample on him. Of course there is no sleep for the cowboy on the way to market. Day and night are alike to him. When the destination is reached, it is difficult to tell which is in the most pitiable condition, the cowboy or the cow. This is especially true when the distant market sought is Chicago. Most of the cowboys declare, when the trip is accomplished, "Never catch me in that business again"; but they forget the hardships before the next annual market season, and play the heroic over again.

"Blabbing calves," as it is called, is a method adopted to wean a calf when the mother is growing thin. "A 'blab' is a piece of thin board, six inches by four inches, which has a piece cut out of the middle of one of the longer sides, so shaped that you can just force it on to the membrane that divides the nostrils of a calf. When put on, it hangs down over the mouth of the animal so that it cannot suck, but is able to graze without difficulty. When you start out on

a blabbing expedition, you place several blabs in your pocket and ride along till you see a big calf whose dam looks as if she would be the better for being relieved of the support of her progeny. You then take your lariat off your saddle, and, holding it in convenient coils in your left hand, with the running noose in your right, you gallop after the calf till you get close up to it. Then you whirl the noose round your head two or three times, to get a good swing, and launch it at the head of the calf. If you are like me, you will probably find no result, the calf continuing to pursue his way across the prairie with the same vigor as before. Then, if you have a professional cowboy



CHICAGO STOCKYARDS.

with you, he takes up the running, and probably brings the calf to book before long, though even he will not always succeed at the first throw. When you have the calf roped, it is an easy matter to throw him down and stick the blab on his nose, after which you turn him loose and go on in quest of another."

Since the New West contributes so largely to make the stockyards of Chicago what they are, we will stop here to describe them.

The stockyards of Chicago are a cattle city, covering three hundred and twenty acres, laid out in complete order, lighted with gas, supplied with pure water, with ample hotel accommodations for

cattlemen, and connected by rail with the entire railway system of the West. Two hundred acres have been covered with yards, pens, feed-barns, scale-houses, and platforms for loading and unloading stock. The remaining one hundred and twenty acres are covered with railway switch-tracks, side-tracks, etc., for the purpose of connecting the marvellous city of live stock with the railroad world. There are seventy-five miles of these switch and side-tracks.

This remarkable city of live stock has a bank, an exchange, telegraph and telephone offices, a post-office, and a newspaper. It has thirty-five miles of sewers, ten miles of streets and alleys, paved with wood, three miles of water-troughs, two thousand three hundred gates, two Artesian wells, and a fire department.

An average of seven hundred men daily is employed to conduct the business of the stockyard ; receiving, yarding, feeding, watching, weighing, and delivering stock. Miles of elevated drive-way have been constructed for driving cattle and hogs over the ground lots, pens, etc., from the central portion of the yards to the different packing houses adjacent, and to the shipping departments. Of course, the Union Stockyards of Chicago are a marvel so unique and remarkable that the sight-seer who does not visit them can scarcely be said to have seen Chicago.

These stockyards were opened in 1866, and received that year, 393,607 cattle, 961,746 hogs, 207,987 sheep, 1,553 horses, valued at $42,765,328. In 1884 the receipts were, 1,870,050 cattle, 5,351,967 hogs, 801,630 sheep, 18,602 horses, valued at $187,387,680. For the year ending Jan. 1, 1891, there were received: cattle, 3,484,280; hogs, 7,663,828; sheep, 2,182,667; calves, 175,025; horses, 101,566; total, 13,607,766. Value of the same, $231,344,899. Number of cars received, 311,556.

On Jan. 1, 1891, $7,000,000 had been expended in the construction of the Union Stockyards; and their capacity for receiving and yarding stock, at any one time, was 25,000 cattle, 180,000 hogs, 20,000 sheep, and 3,000 horses. Total capacity any day, 228,000.

The following statistics are taken from the report of the company for year ending Jan. 1, 1891: —

Largest Receipt of Stock in a Day.

Cattle, Sept. 29, 1890	23,930
Calves, Sept. 29, 1890	2,661
Hogs, Dec. 5, 1884	66,597
Sheep, June 2, 1890	18,797
Horses, June 8, 1889	1,237
Cars, Dec. 1, 1890	1,808

Largest Receipts of Stock in One Week.

Cattle, week ending Nov. 1, 1890	91,519
Calves, week ending Oct. 4, 1890	7,652
Hogs, week ending Nov. 20, 1884	300,488
Sheep, week ending Oct. 4, 1890	57,683
Horses, week ending March 22, 1890	3,165
Cars, week ending Dec. 6, 1890	7,689

Largest Receipts of Stock in One Month.

Cattle, October, 1890	382,098
Calves, July, 1890	26,425
Hogs, November, 1880	1,111,997
Sheep, October, 1889	227,316
Horses, March, 1890	12,927
Cars, October, 1890	31,527

Largest Receipts of Stock in One Year.

Cattle, 1890	3,484,280
Calves, 1890	175,025
Hogs, 1890	7,663,828
Sheep, 1890	2,182,667
Horses, 1890	101,566
Cars, 1890	311,557

Valuation of Stock for Twenty-Five Years.

1866	$42,765,328	1879	$114,795,834
1867	42,375,241	1880	143,057,626
1868	52,506,288	1881	183,007,710
1869	60,171,217	1882	196,670,221
1870	62,090,631	1883	201,252,772
1871	60,331,082	1884	187,387,680
1872	87,500,000	1885	173,598,002
1873	91,321,162	1886	166,741,754
1874	115,049,140	1887	176,644,597
1875	117,533,942	1888	182,202,789
1876	111,185,650	1889	203,321,924
1877	99,024,100	1890	231,344,879
1878	106,101,879		

Total	$3,207,981,448
Average weight of hogs, 1890	234 lbs.

How it is that cattle can be exposed through the extreme cold of winter and not perish in the most northern latitudes of the New West is an enigma to many. Perhaps the following brief statement from the Bismarck *Tribune*, concerning the cattle business in Montana and Dakota, will throw light upon the subject: —

"It is now conceded that Montana and a portion of Dakota is the greatest stock region in the world. The country is rolling, and the cattle find excellent shelter from severe storms which sometimes prevail. The snow-fall is light and the snow is dry. No crust forms, and cattle do not freeze their feet, as is the case in Kansas and

Nebraska, where sleet storms are frequent. At no time in the winter does the snow cover entirely the cured grasses of the Montana ranges. Cattle have no trouble to get enough to sustain life and even get fat. In Kansas frequently the backs of the cattle are covered with ice to the depth of an inch or two, and the wet snow 'balls' on their feet. A severe cold snap comes, and the animals die from exhaustion and frozen feet. Montana and Dakota has been the winter home of buffalo for years, and wherever they live and thrive, there also will cattle do well."

The *Pioneer Press* speaks of the Northwestern stock ranges as follows: —

"Persons uninformed as to the nature of the country, and knowing that the cold has been extreme throughout the Northwest this winter, are apt to refuse credence to the statement that the loss of animal life on the Montana and Dakota ranges, so far, has been slight, and the prospects are good for successful wintering of stock through the remainder of the season. Those who know the peculiar adaptability of the country in question to stock-raising are not surprised at the small loss of life reported. Montana and Dakota beeves have far better chances to pull through the severest weather safely than their brethren of Kansas and Nebraska, and the statistics show that the amount of loss in the former is not nearly so large as in the latter division. In the Northwestern Territories the ground used for ranges is broken by coulees and ravines, which afford perfect protection from the wind, no matter how fiercely it rages on the plains above. Cattle are like men in that they can stand a terrific degree of still cold, but when exposed to storm perish quickly. In portions of Montana, strange as it may seem, the winter season is far shorter than it is farther south, since the chinook winds, which often commence early in February, divest the ground of snow, and leave the succulent buffalo grass exposed and easy picking. The coulees, too, are not all drifted full, many of them showing drifts on one side only, while the other is bare, or so nearly so that acclimated cattle will paw the snow aside readily and graze with little hindrance. The grazing country of Nebraska and Kansas is far flatter than that further north, the wind gets a wider and longer sweep, and the thin belts of timber along the streams are but little, if any, protection. Besides, the upper animals are inured to colder weather and will thrive in a temperature which would be certain death to the hardiest of Kansas or Nebraska steers. Any honest ranchman, from north or south, will bear witness to the truth of these statements."

In estimating the profits of stock-raising in the New West, it is usual to deduct five per cent for losses by the cold of winter. But, in ordinary winters the average loss will not be more than two or three per cent. In winters of great severity, the losses will run up to ten, fifteen, and even thirty per cent; but such winters are infrequent. A stockman writes: —

"As the days grow warmer, an annoying insect called the 'heel-fly' makes its appearance. The cattle are in great dread of this pest,

HAULING A COW FROM THE MIRE.

and the instant an animal feels one, it hoists its tail in the air and takes a bee-line for the nearest water. Now a good many of the streams and water-holes in that part of the country have very miry bottoms, so that a cow plunging violently in is very apt to stick there, and, unless assisted out, will certainly perish. Often more cattle are lost in that way than from all other causes, and it is advisable during the spring, and especially during the heel-fly season, which fortunately does not last longer than three weeks, to ride along the dangerous places in a range every day. When a cow is discovered

mired down, two or three men throw their lariats over her horns (if she has none, then over her neck), and taking two or three turns with the rope round the horns of their saddle, drag her out on *terra firma.* If she has not been in very long, she generally goes off all right; but if she has been in a sufficient time to become thoroughly chilled, she will probably die. Sometimes her legs are so benumbed that she has to be assisted up before she can stand, and when this happens, frequently the first thing which she does when she finds herself on her feet is to put down her head and charge her deliverers. But in her weakened condition it is easy enough to get out of her way, and she either falls down in her further attempt or abandons the chase." Of the Texas fever, he remarks: —

"Texas, or Spanish fever, as it is sometimes called, in a very curious disease. It usually originates with cattle that have come up from Southern Texas. . . . But the peculiarity about Texas fever is that the originators of it do not die from it nor even appear to be diseased. When, however, any of the 'graded' cattle come in contact with one of those fever-breeding herds, or even graze over the ground along which one has passed, it may be weeks previously, sickness and death are sure to follow. The better bred an animal is, the more liable is he to the disease. Texas cattle that have been wintered in Kansas sometimes show symptoms of disease after being exposed to the contagion of a herd from the south, but they usually soon recover, while in a herd graded up with short horn or other fine blood mortality is often considerable. But an animal that has thus caught the disease cannot communicate it further. It never spreads beyond those that have received the contagion directly from the Texas herd. Consequently the fears sometimes expressed that Texas fever might be imported into England are perfectly groundless."

The prairie fire is a foe to stock-raising, endangering often both ranch and herds and flocks. A Dakota newspaper describes a prairie fire in that territory thus: —

"Last Sunday evening, as the sun was sinking in the western horizon, a fire was noticed encircling this place, and at no greater distance than twenty miles to the north and west. The scene that immediately followed was too horrible to be thought lightly of. The whole heavens seemed as one mass of seething, hissing fire. The roar that accompanied the flames as they darted upward, was enough to startle the pioneer and completely shatter the bold and fearless tenderfoot. The dense cloud of smoke that hovered above the fire sent huge coils upward that, as the flare of the flames showed against them, pictured

to the beholders standing below and shivering with fear, grimacing demons as they flitted about in their aerial home in the skies.

"A cry was raised, and in a few minutes the citizens had turned out en masse with wet bags and coal oil torches, and going to the north and northwest limits of the town along the wagon trail leading west, immediately plied the torches. The grass went off like powder, burning a back-fire twenty feet wide in an instant, reaching nearly a

A PRAIRIE FIRE.

half-mile. Then to meet the creeping flames approaching from the north, a double back-fire was started by the torchmen, and had just been completed when the roar of the flames was heard ascending the hill — only in a moment to flash in the tall grass and meet the back-fire with the swish peculiar to the concussion following the discharge of a cannon. The fire to the west was then about two miles distant, but nearing at the rate of about eighteen miles an hour; and when the north fire had been safely met, all hands went to the southwest

trail, running to about twenty yards north of the new school-house, and started a back-fire on the north side of the trail, and then bringing the fire over the trail, it was left to burn around the south side of the school-house, being watched by eight or ten to prevent the fire spreading to the building. At one time it seemed as though the blaze would get the best of them, but the wet sacks were applied and the flames subdued. Others parties were sent in different directions and succeeded in checking the fire. The damage done, however, was estimated at $10,000."

When such a fire is started near the stockman's ranch or herd, everything is in peril. A woman on a ranch was asked by a visitor from the East, "What are your precautions against fire?" She replied: —

"A can of kerosene and a bundle of matches to set back-fires with, though the fire-guards of ploughed ground that you have seen all round the ranch are the ounce of prevention, better than any cure. Then we always keep a hogshead full of water at the stable, ready for carting to the spot."

"A hogshead of water! What good can a hogshead of water do against a prairie fire?"

"Oh, we don't put it on with a hose, I assure you. My imagination gasps at the conception of managing a prairie fire with a hose. We dip old blankets and old clothes in it, or boughs of tree if we can get them, and beat the fire down with them."

"The illustration followed soon. All day smoke had been drifting over Cameiro (Kansas), and at nightfall the scouts reported that the whole force better be put on. The 'whole force' at the moment consisted of about twenty men who had just come in to supper, and who started at once in wagons and on horseback. Ponies were ordered after dinner for the entire household, even the ladies riding far enough to have a view of the exciting scene, — parties from New York were spending the summer here. There were no tumbling walls or blazing buildings, and there was no fear of lives being lost in upper stories; but there were miles upon miles, acres upon acres, of low grass burning like a sea of fire, while in the twilight shadows could be seen men galloping fiercely on swift ponies, while the slow wagons crept painfully, lest the precious water should be spilled, from every homestead, each with its one pitiful hogshead. It seemed incredible that such a mass of flame could ever be put out by such a handful of workers; and it was only, indeed, by each man's laboring steadily at his own arc of the great circle, trusting blindly that others

were at work on the other side, as of course they always were, that the lurid scene darkened down at last."

An eye-witness describes as follows, the way of guarding ranches and stock against prairie fires: —

"Adjoining the sheep ranch was a cattle ranch belonging to a Swiss gentleman, a brother-in-law of the American sheep-man, and they made a common fire-guard to go round both their ranges. The plan was to plough four furrows all round the outside of the ranges, and then another ring of four furrows was ploughed inside the first, at a distance of about fifty yards. In order to make the operation of burning the guard safer, a mowing-machine had been run round on the outside of the outer ring of furrows and on the inside of the inner ring. The total length of the guard was about seven miles. After the ploughing and mowing were done, we proceeded to burn the guard. Two men fired the grass along the two sets of furrows, the furrows preventing the fire from getting into the range or out to the open country. Behind the men firing came two men with wet sacks, with which to beat out the fire in case it showed any inclination to jump the furrows. A fifth man drove a wagon which contained a tub of water in which to wet the sacks from time to time. The man firing on the leeward side of the guard would always precede the other by a little, so that when the flame was swept across by the wind it might be met by the back-fire from the leeward furrows, which would prevent so much danger of its getting over into the grass beyond the guard. Of course it would not be safe to attempt to burn the guard when the wind was at all strong. The fire-guard, when completed, presents a barrier of bare ground to an approaching prairie fire, which the latter is unable to cross for lack of combustible matter to feed on. It has to be renewed every autumn, as during the spring and summer it becomes overgrown with grass again."

THE SHEEP RANCH.

It is claimed by many that raising sheep is more profitable than raising cattle. Whether this be true or not, the sheep business of the New West has become very extensive. Flocks of from one to ten thousand are numerous. They multiply very rapidly, so that a flock of one thousand is doubled and trebled in a marvellously brief period. It is estimated that there are four hundred and fifty million sheep in the world, and that about one-seventh of them — (66,000,000)

sixty-six million — are raised in the United States. Of this number the New West has its full share.

We have collected estimates of the profits of sheep-raising from various sources, to which we shall first call attention.

Mr. Hayes has the following in *Harper's Monthly* of January, 1880, and he says of the figures : —

"They apply to the case of a man with capital, coming out, not to take up or pre-empt land, but to buy a ranch ready to his hand.

"Such a one, capable of accommodating five thousand head of sheep, could be had, say, for $4,000, comprising at least three claims three to five miles apart, also proper cabins, corrals, etc. A flock of

SHEEP RANCH.

two thousand assorted ewes, two to three years old, should be bought at an average of $3 each, say $6,000 ; and 60 bucks at an average of $30, or $1,800. A pair of mules and a saddle-horse will cost $275 ; and we will allow for working capital, $1,925. Capital invested, say, Oct. 1, $14,000.

"Under ordinarily favorable circumstances, and with great care, one may expect during May his lambs, and estimate that there will be alive of them at time of weaning a number equal to seventy-five per cent of his ewes, or, say, one thousand five hundred, on the 1st of October, a year from the time of beginning operations.

"His gross increase of values and receipts will then be, for that year, as follows : —

1,500 lambs (average one-half ewes, one-half wethers), at $2 each			$3,000.00
In June he will shear his wool, and get from:			
2,000 ewes, 5 pounds each, or 10,000 pounds, at 21 cents		$2,100.00	
60 bucks, 17 pounds each, or 1,000 pounds, at 15 cents		150.00	2,250.00
			$5,250.00
Expenses:			
Herders, teamsters, cook, and provisions		$1,835.00	
Shearing 2,060 sheep, at 6 cents		123.60	
Hay and grain		275.00	
		$2,233.60	
Losses (all estimated as made up, in money):			
Ewes, 4 per cent on $6,000	$240.00		
Bucks, 5 per cent on $1,800	90.00	330.00	
Depreciation:			
On bucks, 5 per cent on $1,800		90.00	2,653.60
Net profits for first year			$2,596.40

Second Year.

The 1,500 lambs will be a year older, and worth an additional 15 per cent (or 15 per cent on $3,000)			$450.00
1,500 new lambs will be worth, as before			3,000.00
And there will be of wool from:			
2,000 sheep, 5 pounds each, or 10,000 pounds, at 21 cents		$2,100.00	
1,500 lambs, 4 pounds each, or 6,000 pounds, at 21 cents		1,260.00	
60 bucks, 17 pounds each, or 1,000 pounds, at 15 cents		150.00	3,510.00
			$6,960.00
Expenses:			
Herders, etc.		$2,060.00	
Shearing 3,560 sheep, at 6 cents		213.60	
Hay and grain		350.00	
		$2,623.60	
Losses:			
On ewes, 4 per cent on $6,000.	$240.00		
On bucks, 5 per cent on $1,800	90.00		
On lambs, 7 per cent on $3,000	210.00	540.00	
Depreciation:			
On ewes, 5 per cent on $6,000	$300.00		
On bucks, 5 per cent on $1,800	90.00	390.00	3,553.60
Net profits for second year			$3,406.40

Third Year.

The second year's lambs will be worth an additional 15 per cent, or, say (15 per cent on $3,000)			$450.00
There will be 1,500 lambs from original 2,000 ewes, and, say, from new 750 ewes (one-half of 1,500), not more than 60 per cent in first lambing, or, say, 450— in all, 1,950 lambs, at $2.			3,900.00
Wool will be:			
From 3,500 ewes, 5½ pounds each, or 19,250 pounds, at 21 cents		$4,042.50	
From 1,950 lambs, 4 pounds each, or 7,800 pounds, at 21 cents		1,638.00	
From 60 bucks, 17 pounds each, or 1,000 pounds, at 15 cents		150.00	5,830.50
			$10,180.50

Expenses:			
Herders and fodder		$2,970.00	
Shearing 5,510 sheep, at 6 cents		330.60	
New corrals, etc.		300.00	
		$3,600.60	
Losses:			
On ewes, 4 per cent, on $6,000	$240.00		
On new sheep, 4 per cent on $4,500	180.00		
On lambs, 7 per cent on $3,000	210.00		
On bucks, 5 per cent on $1,800	90.00	720.00	
Depreciation:			
On old ewes, 10 per cent on $6,000	$600.00		
On bucks, 20 per cent on $1,800	360.00	960.00	5,280.60
Net profits for third year			$4,899.90

Recapitulation.

First year's profits	$2,596.40
Second year's profits	3,406.40
Third year's profits	4,899.90
Total	$10,902.70

An official document from Idaho says: —

"There are not many sheep raised here, but the business is a good one. Some time since I had a conversation with a friend in relation to his experience in sheep-raising, and learned the following facts: —

In May, 1877, he bought 404 ewes and 123 wethers, at $3.00	$1,581.00	
In 1878 he sold 200 at $3.00		$600.00
In 1879 he sold 200 at $3.00		600.00
In 1880 he sold 200 at $2.50		500.00
When talking with me he had 2,300 for which he had been offered $2.00 each		4,600.00
Total		$6,300.00
Deduct cost of flock		1,581.00
Profit		$4,719.00

"During the time he had not purchased any sheep, and was unable to tell the amount of wool he had sold, but it is fair to presume that the amount received for the sale of wool would more than pay for the labor of looking after his flock, and the small amount expended in buying what hay was fed to them.

Mr. Fossett says of sheep-raising in Colorado: —

"Thus far, the business of sheep-raising in Colorado has been very profitable. A flock of 1,800 ewes, costing $4,500, were placed on a ranch in Southern Colorado. In eight years 1,600 sheep were killed for mutton, and consumed on the ranch, and 7,740 were sold for $29,680. There are 14,800 head on hand, worth, at $3 per head,

$44,400. The wool-clips paid for shepherds and all current expenses. The result shows a net profit over the original investment of $69,520, equal to 193 per cent per annum for eight years in succession. Per contra, out of a flock of 1,200 very fine, selected ewes, worth $4 per head, 800 died during a storm of two days last March. The 400 that survived raised last summer more than that number of lambs. The dog is a valuable auxiliary in the care of sheep. The 'Scotch collie' surpasses all others in his natural aptitude for this work, and oftentimes one well-trained sells for $150."

A reliable estimate from Montana shows the attractions of that territory for the sheep-raiser: —

"Profits on wool-growing are estimated by many as greater than on cattle-raising; and even the more conservative breeders figure a profit of from 25 to 35 per cent per annum upon all capital invested, and all agree that the wool clip will pay every item of expense, leaving the increase a clear gain. The loss from all causes is estimated at from 2 to 3 per cent. The annual increase of flocks is placed at 48 per cent, and the increase of 1,000 ewes, 2 years old and upwards, from 80 to 150 per cent, probably averaging 90 per cent. Sheep sell readily at from $3 to $3.50 per head. One herder can take care of 2,000 head. Sheep-raising is emphatically the poor man's industry in Montana; for, having a free range, timber at hand for construction of sheds and corrals, and, in fact, no capital needed for running expenses after the first season, he is master of the situation if he can command any sum from $500 upwards for the purchase of a small flock.

"A careful calculation of the profit on 1,000 ewes for a term of 5 years, made by a prominent sheep-owner, shows the following: —

YEAR.	EWES.	INCREASE.	EWES.	WETHERS.	CLIP.
First	1,000	700	350	350	$1,000
Second	1,175	822	411	411	1,700
Third	1,555	1,088	544	544	2,522
Fourth	2,033	1,423	711	711	3,710
Fifth	2,660	1,862	931	931	5,032
Totals	...	5,895	2,947	2,947	$13,964

Total wool clip	$13,964
5,895 sheep, at $3	17,685
30 Merino bucks, at $25	750
Interest on cash obtained for wool	3,684
	$36,083

Investment and Expense.

1,000 ewes, at $3	$3,000	
Cabin, shed, and canvas	800	
32 Merino bucks, at $50	1,600	
Herders' wages and board	2,600	
Taxes and minor expenses	1,000	11,100
Profit		$24,983

Another estimate from an official document of Kansas is as follows: —

"The following estimate of the cost of a start in sheep-raising is made officially in the reports of the State, and assumes that the investor takes personal charge of the place, as a man would be likely to do who starts on a capital of $3,500, beginning operations about April 1, and performing most of the labor necessary to produce the crops himself; the purchase of sheep to be made Sept. 15 following, by which time preparations for shelter and feed are substantially perfected.

"If the ranchman desires a larger dwelling than the one provided, the land can be bought of the railroad company on 6 years' time, at 7 per cent interest, thus reserving a larger portion of cash for additional improvements. Or, he could purchase 320 instead of 160 acres, as estimated, the annual payments on which could be promptly met from sales of wool, increase of flock, or grain grown, if an additional acreage were put under cultivation. This would, no doubt, be a profitable investment, as an increase in value of real estate is not improbable.

Investment.

160 acres of land, at $2.50	$400.00	
House	300.00	
Corrals	100.00	
Windmill, pump, and troughs	125.00	
Team, wagon, and harness	325.00	
Farming implements	50.00	
500 Merino ewes, at $3	1,500.00	
6 Merino bucks, at $25	150.00	$2,950.00
Cash		550.00
Total		$3,500.00

"On such an investment a profit of 25 per cent, exclusive of the advance in the value of the land, may be counted upon, and a living made in the meantime."

The remarks made on another page about depression of the cattle business applies with equal force to sheep-raising. Whether the same causes have operated to depress this department of stock-raising or not, the herder has not been rewarded for his toils and sacrifices for several years past as he was a decade ago. And yet, it is a great and inviting business even now; and the ranchman, who once worked to make a fortune in ten years, will learn to be satisfied if he makes it in twenty or thirty years. Foresight, economy, greater wisdom, and tact may be the outcome of the past few years of depression.

The reader will be interested in the description of a mammoth sheep ranch, which, if not exactly embraced in the New West, is more nearly related to it than to any other part of the world.

"The little schooner *Santa Rosa* arrived in port from Santa Barbara a few days ago," says the San Francisco *Call*. "She comes up to this city twice a year to secure provisions, clothing, lumber, etc., for use on Santa Rosa Island, being owned by the great sheep-raiser, A. P. Moore, who owns the island and the 80,000 sheep that exist upon it. The island is about 30 miles south of Santa Barbara, and is 24 miles in length and 16 in breadth, and contains about 74,000 acres of land, which are admirably adapted to sheep-raising. Last June Moore clipped 1014 sacks of wool from these sheep, each sack containing an average of 410 pounds of wool, making a total of 415,740 pounds, which he sold at 27 cents a pound, bringing him in $212,349.80, or a clear profit of over $80,000. This is said to be a low yield; so it is evident that sheep-raising there, when it is taken into consideration that shearing takes place twice a year, and that a profit is made of the sale of mutton, etc., is very profitable. The island is divided into four quarters by fences running clear across at right angles; and the sheep have not to be herded like those ranging about the foothills.

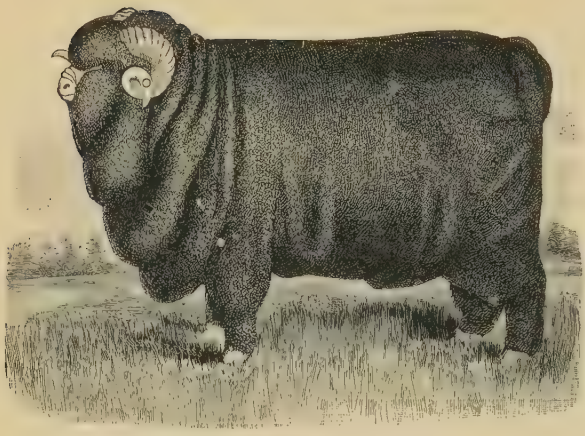
"Four men are employed regularly the year round to keep the ranch in order and to look after the sheep; and during shearing time fifty or more shearers are employed. These men secure forty or fifty days' work; and the average number of sheep sheared a day is about ninety, for which five cents a clip is paid; thus, $4.50 a day being made by each man, or something over $200 for the season, or over $400 for 90 days out of the year. Although the shearing of 90 sheep a day is the average, a great many will go as high as 110; and one man has been known to shear 125. Of course, every man tries to shear as many as he can, and, owing

to haste, frequently the animals are severely cut by the sharp shears. If the wound is serious, the sheep immediately has its throat cut, and is turned into mutton and disposed of to the butchers; and the shearer, if in the habit of frequently inflicting such wounds, is discharged. In the shearing of these 80,000 sheep, a hundred or more are injured to such an extent as to necessitate their being killed; but the wool and meat are, of course, turned into profit.

"Although no herding is necessary, about two hundred or more trained goats are kept on the island continually, which to all intents and purposes take the place of the shepherd dogs so necessary in mountainous districts where sheep are raised. Whenever the animals are to be removed from one quarter of the island to another, the man in charge takes out with him several of the goats, exclaims in Spanish, "Cheva!" meaning sheep. The goat, through its training, understands what is wanted, and immediately runs to the band; and the sheep accept it as their leader, following wherever it goes. The goat in turn follows the man to whatever point he wishes to take the band. To prevent the sheep from contracting disease, it is necessary to give them a washing twice a year. Moore having so many on hand, found it necessary to invent some way to accomplish this whereby not so much expense would be incurred and time wasted. After experimenting for some time, he had a ditch dug eight feet in depth, a little over one foot in width, and one hundred feet long. In this he put six hundred gallons of water, two hundred pounds of sulphur, one hundred pounds of lime, and six pounds of soda, all of which is heated to one hundred and thirty degrees. The goats lead the sheep into a corral or trap at one end, and the animals are compelled to swim through to the further end, thus securing a bath and taking their medicine at one and the same time.

"The owner of the island and sheep, A. P. Moore, a few years ago purchased the property from the widow of his deceased brother Henry for $600,000. Owing to ill-health, he has rented it to his brother Lawrence for $140,000 a year, and soon starts for Boston, where he will settle down for the rest of his life. He still retains an interest in the Santa Cruz Island ranch, which is about 25 miles southeast of Santa Barbara. This island contains about 64,000 acres, and on it are 25,000 sheep. On Catanna Island, 60 miles east of Santa Barbara, are 15,000 sheep. On Clementa Island, 80 miles east of that city, are 10,000 sheep. Forty miles west of the same city is San Miguel, on which are 2,000 sheep."

Sheep are raised both for food and clothing. Figures already



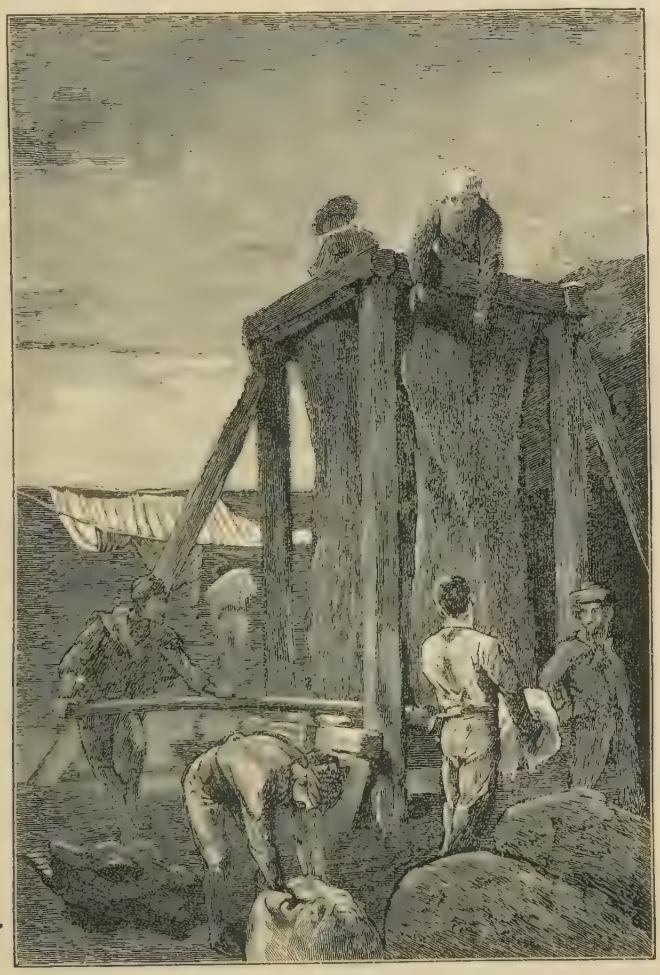
CAPTAIN JACK.

given show to what enormous proportions the industry has grown, with plenty of room to double, treble, and quadruple it. The best breeds for raising wool are selected, and these are tended with great care and study, so that improvement in breeds and methods are marked and rapid. One of the most remarkable sheep for yielding wool known to herders is represented by the cut above — a ram of peculiar make-up, with a fleece of such length and density as to weigh from twenty-two to twenty-five pounds. His sire was Captain Jack; hence the above is Captain Jack, Jr. He combines two leading features in Merino breeding, length of staple and density of fleece, without the usual accompaniment of superfluous oil, and massive wrinkles with coarse and hairy folds. He weighs about a hundred and fifty pounds, and is closely built to the ground. That God made him for usefulness there can be no question; for he yields as good mutton for eating as he does wool for weaving into cloth.

SHEEP SHEARING.

A great variety of sheep are raised in the New West, so many that we shall not attempt to enum-

erate them here. A variety of breeds from foreign countries adds some of the finest to Western flocks. The opinions of shepherds differ in respect to the classification of different breeds of sheep, as cattlemen differ respecting breeds of cattle.



BAGGING WOOL FOR TRANSPORTATION.

Shearing time is a lively season, and sheep-shearers are a unique class of men. Some of the California sheep-shearers excel all others in the number they will divest of their fleeces in a single day. It is claimed that some of them will shear 125 sheep per day, and that the average of shearers per day, in disposing of a large flock, is 90.

The price paid for shearing is from four to six cents apiece, averaging five cents.

The Union Pacific Railroad has erected extensive sheds for the accommodation of wool-growers and their flocks. These sheds are erected at convenient stations along the line. Sheep-raisers find it more convenient to drive their flocks to the railway station, and shear them there, than to shear them at home, and transport the wool thither. The plan has proved successful. The sheds are sufficiently large to accommodate from thirty to one hundred shearers at a time. The railway company has also built large corrals in which the sheep are folded. Then there are small enclosures for each shearer, into which fifteen or twenty sheep can be put. When a sheep is sheared the fleece is tied together by the shearer and put into a bag hanging down from the loft. Every two feet these bags are hanging, and when they are filled, men in the loft draw them up, assort, weigh, and ship the wool.

The illustration represents the method of bagging wool for shipment. When the shearer has completed his flock, he cries out "check," and a man in waiting drives the sheep from the pen, and other men soon fill it up again with another flock.

The sheep are counted after they are sheared. They are driven from the pen through a small passage where they are readily counted before entering the large corral beyond. The cut opposite represents the sheep going through this passage-way to the large enclosure.

A few years ago, on July 8, at Hugo, Col., twelve thousand sheep belonging to the Holt Live Stock Company were sheared, and then driven back to the ranch. TWELVE THOUSAND IN ONE DAY creates a scene scarcely second to a "round-up" for the entertainment of spectators!

A writer rehearses several incidents that are instructive to readers who desire to know somewhat of the sheep business. Speaking of the eastern friends at the ranch, he says: —

"One very hot day they braved the heat themselves for the sake of going out on the prairie to see how sheep keep cool. Instead of scattering along the creek, seeking singly the shade of the bushes or the tall trees only to be found near the creek, they huddle together in the middle of the sunny field, more closely than ever, hang their heads in the shadow of one another's bodies, and remain motionless for hours. Not a single head is to be seen as you approach the herd; only a broad level field of woolly backs, supported by a small forest of little legs.

* * * * * * * *

"To see the sheep go in and out, night and morning, was a never-failing amusement. Sometimes the ladies wandered down to the corrals at sunset to see the herds come in, and you would have supposed them to be waiting for a Fourth-of-July procession with banners, from the eagerness with which they exclaimed, 'Oh, here they come! there they are!' as the first faint tinkling of the bells was heard in the distance. If two herds appeared at once from opposite directions, the one with lambs had the 'right of way,' and Sly, the sheep-dog, — not the only commander who has controlled troops by

COUNTING SHEEP.

sitting down in front of them, — would hold the other herd in check till the lambs were safely housed.

"They had arrived just in the midst of lambing, and each herd, as it came in at night, would number more than when it went out in the morning, the little lambs that had been born on the prairie during the day taking their constitutional of two or three miles back to the corral that they had never seen, as easily and with as much dignity as if they had known all about it for years. At the mature age of three or four days, however, some of them would decide that they preferred

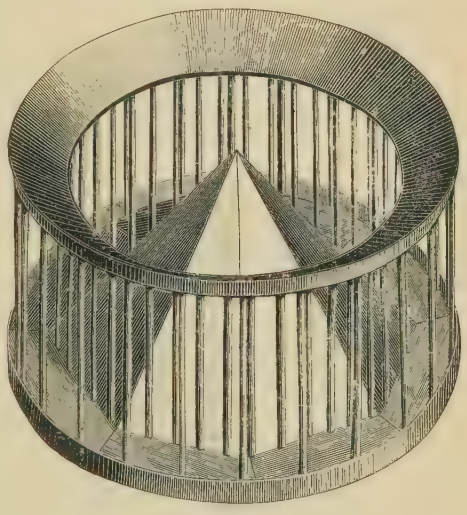
to remain on the open prairie; then woe to the unhappy herder! Many and many a night would the ladies walk out to meet the herd, on the sole chance of seeing the inimitable fun of such a catastrophe. For pure, unadulterated amusement, I know of nothing equal to witnessing the chase of a grown man over a boundless prairie after a little creature less than a foot long and not more than three days old.

THE RUNAWAY LAMB.

The running of a man for his hat is nothing to the entertainment of such a spectator; the struggles of the driver of a refractory mule are nothing to the sufferings of such a herder. It is martyrdom without any glory, and I believe the lamb is seldom caught or tired out without the aid of a sheep-dog."

Sheep-raisers have exhausted their ingenuity in devising the most convenient methods for feeding sheep. The following cut is the latest invention introduced into the New West: —

"The diameter of the rack is five and one-half feet; height, four feet nine inches. Twenty-two bars in the outside rack admit of twenty-one sheep feeding at once. The bars, one and one-half inches in diameter, are made to turn easily in the top and bottom sockets. There is a space of seven inches between the outside and the inside bars; the latter, thirty-three in number, are four inches apart and a square inch in size. Within this rank of bars is a wooden cone, three feet and nine inches in diameter at the base, and three feet high. This cone, with the arrangement which holds the two ranks of bars at the top of the rack, forms the receptacle of the forage. A plinth, three inches wide, is attached to the top and another to the bottom of the rack, outside the exterior rank of bars, and completes the whole.



A NOVEL SHEEP RACK.

"The following are the advantages of this rack: being circular, each sheep can feed without annoying its neighbor, and the ewes and lambs are thus freed from all chance of injury. The bars revolving on their supports, the sheep do not rub their necks in feeding. If the rack is placed under a shoot or trap-door, the hay or straw can be dropped into it, without falling on the sheep, and thereby soiling the wool. If, instead of forage, roots are given to the sheep, the bottom of the rack, with its plinth, forms a convenient receptacle for them."

The editor of the *Journal of Agriculture*, speaking of the habits of sheep, says:—

"Sheep adapt themselves to a wider latitude than any domesticated animal, except dogs. For more than a thousand years they have been raised with profit in Iceland, where the climate is so cold that few cultivated crops can be produced. They are also raised with profit in all the countries of Europe and Asia that border on the North Sea. Sheep raising has lately been undertaken in Patagonia with excellent promise of success. South Africa and all the islands

in the Indian Ocean are found to be well adapted to the raising of sheep. Spain and Asiatic Turkey have long produced most excellent wool, although the climate of these countries is very warm. Sheep do well in every State and Territory in this country, and are better adapted to poor land than any other domesticated animal except the goat. There is economy in keeping a few sheep in pastures that are chiefly devoted to other animals, for the reason that the former will eat many kinds of weeds and grasses that the latter will leave."

A WOMAN ON A CATTLE RANCH.

This is a veritable experience received from the lips of the woman herself. We do not present it because it is at all exceptional in regard to hardships and checkered experiences. Indeed, it is the story of one who enjoyed considerable more of privilege and comfort than falls to the lot of the average ranch-life. She was young in years and in matrimony. Her husband bought out a ranchman in the New West, seventy-five miles from the town in which he was temporarily sojourning. He was to remove thither to spend about eight weeks in putting things in running order, and to establish himself as a cattleman. His wife proposed to accompany him and share ranch-life with him for this brief period.

It was one of the hottest July days ever known in the New West when she started with her husband and one cowboy for the ranch. A long drought had parched the earth, and the streams on the plains were dry, adding intensity to the heat of the day. The burning rays of the sun beat down upon the two occupants of the open ranch-wagon, and the poor horses wilted under the great heat and a heavy load. Not a drop of water was found on the way until after four o'clock in the afternoon. The lips of the weary travellers became parched and swollen, and, but for the free use of lemons, which were thoughtfully provided in the morning, would have cracked and bled. The sight of water about four o'clock gladdened man and beast.

One or two hours later, on approaching a town where they purposed to spend the night, the wagon sunk into the mud to the hubs of the wheels in crossing an irrigating ditch. The tired horses vainly tried to pull it out, until, exhausted, they refused to pull more, and the disgusted stockman sat down upon the bank of the ditch, the very picture of despairing weariness.

"Going to stay here all night?" inquired his better half in a tone that was a cross between facetiousness and bitter disappointment.

"I shall stay here till help comes along," answered the husband.

Sure enough, within a few minutes, a man with a pair of horses appeared upon the scene, and kindly offered to help our stockman out of his difficulty. The four horses together pulled the wagon out of the mud, and on that night our heroine slept upon a soft bed in a country inn, instead of under a tent. On the following morning, refreshed and happy, and supplied with a keg of water, that the pain-

GOING TO THE RANCH.

ful experience of the previous day might not be repeated, our travellers continued their journey. At noon they came upon an old deserted stable in which the horses were fed, and the travellers themselves regaled with an ample lunch. At night they spread a tent, and were cooking an inviting supper when a thunder-shower burst upon them in great fury, deluging the tent, putting out their fire, and spoiling the food, as well as drenching the occupants. Supperless and soaked, they spread their blankets for the night, and lay down to wakefulness instead of dreams. However, they came out of

the hardship with flying colors, and, before noon on the next day, took possession of the ranch, and commenced ranch-life. In a letter to a relative, the woman said: —

"Well, here I am at camp, and like it very much so far. I am terrible lonely to-day. G—— was obliged to go away this morning, and will not be back until to-morrow. I am here alone with Mrs. ——'s brother. . . . I had nine and ten in my family the first two days; then four; last night, seven; and to-day, two. The men have now gone out on the calf round-up, and will be gone three weeks, probably. . . . I cannot give you much of an idea of the camp here. The house is a good one, and unusually nice for a cow camp. It is stone inside and out, and rough every way; but we are very comfortable. It stands low down in a gulch, with hills front and back, which cut off all views; and still it is pleasant. We have two large rooms, now furnished with chairs, two home-made tables, two home-made bedsteads, and empty boxes for additional conveniences. . . . The flies here were enough to craze one, but we brought some netting with us, and C—— made screens for the doors and windows, so that we are protected from their raids. . . . We have cows, ducks, hens, a dog nearly as large as Major, and a nice cat. . . . I have not made any butter yet, but shall very soon, for I miss it fearfully. I have been cooking, cleaning, and arranging things generally, but shall have more leisure soon, as my family will be smaller. One of the men helps me. He cooks for the boys on the round-up, and between helps me. I do all the cooking except the meat. The men appear to think that my bread and pies were made to eat. I made a large loaf of brown bread for supper last night, and the boys just devoured it. Don't worry about my staying alone, for G—— says he will never leave me without C——, who is trusty, and is hired to work about the house, milk, and do chores. Crazy [the name of her pony] knew me when I came, and behaved as cunning as ever. I shall begin riding her soon. I would not part with her for love nor money. . . . If you do not hear from me every week, don't worry, for something may happen to prevent us going to the post-office, which is twenty-five miles distant. But you must write every week as usual, for it would be disappointing indeed to send so far for letters and find none. We send to the office once in two weeks sure, and as much oftener as we can. I have nothing further to say, except that I am getting along all right — have four in my family now, and one of the boys helps me in the house. All of them are kind and obliging, and never allow me to bring a pail of water from the

spring." Of course, she could not complain much of great hardships.

The spring was one of the finest in all the New West, with a house over it, and a small pond behind it, into which, at times, the overflow empties. There was a barn, shed, and henhouse, also, with two corrals. A tent was also spread on the grounds to accommodate the overflow of cowboys and visitors at night. As the hospitality of

THEIR RANCH HOME.

that country provided free beds and board for transient comers, a tent arrangement was absolutely necessary. From three to twelve transient lodgers was often the quota for whom provision was made.

"I have cooked three dinners in a day," she said to the writer; "the first for the family; the second, one or two hours later, for two newcomers; and I had scarcely washed the dishes after the second dinner, when a fresh arrival of another man made a third dinner necessary."

Ham, codfish, fresh beef and veal, venison, poultry, antelope, and rabbits, supplied the larder with a variety of meats that would be luxurious in the East, — not all at the same time, of course, but as circumstances favored. Sometimes the bill of fare was reduced to ham or codfish without potatoes or any other vegetable. As it was the ranchman's first season, begun in July, he had no garden, and therefore no vegetables, except when they were purchased at the nearest market, from forty to sixty miles away. Sometimes, however, a neighboring ranchman, coming that way, would bring them a welcome present from his garden. Tea and coffee, especially the latter, were prominent in the daily bill of fare.

The nearest neighbors (all of the masculine gender) were eighteen miles distant, and the nearest woman *thirty* miles away. Of the latter our heroine wrote to a friend, "There are several women at ——, but I think they must be stuck-up, for they have not called upon me yet, and they are only *thirty* miles from here."

The following extracts from her letters to a relative will furnish still more interesting information of a woman's life on a ranch : —

"The round-up reached here on Saturday, and we have been full ever since, — nine all the time, and twelve last night in my family.

"G—— is going away again this week. He is going to ——, two hundred miles distant, to buy horses. I expect he will be gone ten days, perhaps longer. I dread it very much. There will be two men here, but it will be lonely enough even then.

"I climbed the Buttes last week. They are over a hundred feet high, made of clay or adobe, the top being petrified like stone. G—— would not go with me, as he thought it was too hazardous. In one place we had to pass round a curve for fifteen feet on a shelf just wide enough to stand upon. At another point we had to climb up perpendicularly fifteen feet, by means of notches cut for the feet. One of the men went with me because G—— would not. My courage nearly failed me before the feat was accomplished, but the splendid view from the summit paid me.

"The men kill many rattlesnakes here. They killed twelve in one day. At another time they killed three in half an hour. Ed. and I were riding one day last week, and his horse stepped on one that was coiled up. It threw the snake over, and he went into his hole in a hurry. Our dog was bitten by one a few days ago, and his nose was badly swollen for a day or two, and that was all. Rattlesnake bites do not injure dogs.

"We do not have fresh meat at all just now, and ham is getting

stale to me. Ed. has just killed a duck, and we shall have that to-morrow. I am sick of making biscuit. I had them three times a day, and from twenty to thirty each time.

"I have a plenty of eggs and milk, and make puddings and custards. I shall wash to-morrow; Ed. will help me, and then wash for the boys, and he will help me iron. He is very handy and very willing. We miss vegetables very much. I would like a cucumber. We had a squash to-day that some one of the boys bought me, and it was nice. We have not even potatoes now, and I scarcely know how fruit looks.

CLIMBING THE BUTTE.

"We had fourteen letters in the last mail, and you may be sure that we enjoyed them. Last night Ed. was taken sick, fortunately after I had retired, and he had a terrible fit. I could hear him talk as crazy as could be, and it was an hour before he was conscious. He came near having another this morning, but we worked over him and prevented it. C—— takes care of him, and I have not been alone with him at all. I hope G—— will not have to go away again, but I sometimes think if he does I go too, wherever it may be. . . . Two of the men usually sleep in the house, — one on the bed G—— made, and the other on the floor; the others sleep in the tent, which they prefer."

The "Ed." referred to had a thrilling history. His father was the proprietor of a leading daily journal in a large city of the East, — a man of wealth and position. His mother, before her marriage, was a professor in a leading college for females, — an accomplished woman. Their son had received an excellent education, and was familiar with the refinement and style of wealthy families in a large city; but now he was a cowboy, subject to terrible fits, which he claimed were brought on "by smoking cigarettes." His employer and wife had no doubt that the drink-curse was the real cause of his absence from home. As there were no liquors on the ranch, and no place to obtain them for miles, their views on the subject were not verified beyond contradiction. But on the evening of his sickness, as rehearsed above, he went to Mrs. —— and said: —

"I am going to smoke a cigarette, and I shall have a fit after it. You had better retire."

Scarcely thinking that he was in earnest, with a facetious remark she bade him good night and went to bed. Then followed what she described, in which we see some evidence that cigarettes were the cause of his fits, or *delirium tremens*, if that be a more appropriate name. In her next letter she relates the outcome of Ed.'s sickness.

"I closed my last letter rather hurriedly. Ed. grew worse steadily. The night before G—— came he had a terrible spell. Twice we thought he was dying. It took C—— and I to hold him on the bed. The night G—— reached home he had two fits. Two men could scarcely hold him while he was in the first one; but his strength was greatly reduced when the last one occurred. He suffered fearfully, but imagined that he was in heaven with his mother, who died when he was too young to remember her. The next day he was so weak that two men were obliged to lift him into the wagon, and he went off crying as if his heart would break. We made him a bed in the wagon, and sent him to ——, and from there by rail to ——. C—— went with him, and has not yet returned. We hardly thought he would reach there alive; but the man who came back with the team said that he was better when he reached ——; so we hope he will come out all right."

Just seven years after the foregoing was written, in reply to the question, "What became of Ed.?" this woman answered: —

"Poor fellow! we don't know. He recovered by good medical treatment, and left ——, and we have never seen or heard from him since."

It is not strange that, by this time, Mrs. —— should write to a

friend, "Certainly I have variety enough in my life to keep from becoming stagnant."

More extracts from her letters will afford the reader still more light.

"We have a very nice cooking-stove, as large as the one in your winter kitchen. I have made all my bread so far with baking-powder. I should think you were crazy to ask what I do with my washing. Why, I wash it, iron it, wear it, and wash it again. I have every convenience for washing, and do not lift a pail of water, or turn the wringer, or clean up. We have splendid water under the spring-house, and a half dozen other good springs around us where the cattle drink, and water-holes also. My kitchen is large, and I have no trouble in providing for all the men by putting the two tables together. There is no need of furnishing napkins, for G—— and I and Ed. are the only ones of the crowd who ever saw one. I made four cream pies and a cocoanut pie yesterday, and how quickly they vanished before the hungry boys!

"I must stop at once, for I hear a wagon ride up. . . . It was two men, one from ——, whom I was delighted to see. He brought me a bushel of potatoes and a parcel of beets and radishes, and I am eating a radish now. They are so nice! I got them a dinner, — hot biscuit, venison steak, tomatoes, cream pie, and coffee. They thought they would call again when they got hungry.

"I rode ten miles one day last week, and saw three deer, — scared them up not ten feet off. We sent C—— out next morning to shoot one, as we were living on bacon and codfish, with no potatoes. He killed one, and we have feasted ever since. It is very nice eating. The venison we get is not what you get in the East.

"We have any amount of fleas here, and I am half eaten up by them. We have ants, also, but I brought some borax with me, and they have disappeared before it. You ask me what I wear. I wear a shade hat, black Canton, with blue veil on it when I ride, and my scalp at other times.

"We have dug a cellar, or, what is here called a 'dug-out,' in the side of the hill, which will have a roof over it soon, covered with dirt. It is what they call a cellar here."

When lodgings were somewhat crowded, one of the men slept in the above-mentioned dug-out. One night, just before the mistress of the ranch had retired, he came rushing into the house for his gun, shouting "Skunk! skunk!" This disagreeable animal was at home in that country, and, in his peregrinations, on that night, dropped

into the dug-out, with no expectation of meeting a cowboy there. But he did, and actually travelled across his bed, startling the human occupant of the place by his cool impudence. The skunk was as much alarmed as the cowboy in the end, and fled to parts unknown before the latter returned with his gun. Seventy skunks were shot about the ranch from August to November, proving that this unpopular creature thrives full as well in the New West as he does in the East.

Once, during her stay at the ranch, Mrs. —— visited —— with her husband, nearly sixty miles away, to make some purchases, and hire a tenement. She camped out one night each way, going and coming, and enjoyed it hugely. On the way back, she discovered an antelope at a distance; whereupon her husband let drive his six-shooter just to see the wild creature run. He was too far away to be hit, but not too far to be scared, the ranchman thought. What was the surprise of Mrs. ——, and her liege lord, too, to see the animal drop, and not run. Singularly enough the ball took effect in the antelope's head, and he gave up the ghost. It was an accident, however, not the skill of the ranchman. The former was not more surprised to be hit than the latter was to be the hitter. The wild game was carried in triumph to the ranch, where hunger revelled on his carcass.

Here are incidents sufficient to show the reader what the best sort of ranch-life is to an intelligent woman. It is crowded with variety, the unexpected, and the marvellous.

CATTLE KINGS.

We shall close this department with the photographs and brief biographical sketches of seven cattle kings, as in the third and fourth departments we presented railroad and mining kings. While our space limits us to seven successful and widely-known cattlemen, we may say that their number is very large in the New West. Intelligent, enterprising, and persistent, they have hewed their way through all opposition and difficulties to wealth and influence. It has been a hard-fought battle to most of them, but their victories are all the grander for that.

JOHN H. ILIFF.

John H. Iliff was born Dec. 18, 1831, the son of a well-to-do farmer near Zanesville, O. He attended college at Delaware, O., after which his father offered to invest seven thousand five hundred dollars in a

farm for him, near his own, if the young man would remain upon it. But the son declined the offer, saying, "No, give me the five hundred dollars and let me go West." Going to Kansas, he remained three years. Here the Pike's Peak gold excitement of 1859 found him, and he was among the first to cross the Plains to the gold region. Realizing that the army of gold-seekers must be fed, he invested all his means in a stock of groceries and provisions, for which he found a ready market upon his arrival in Colorado. He engaged in business in Denver for a short time, but invested all he had in a small herd of cattle. This herd he drove to the northern part of the Territory for pasturage. The Union Pacific Railroad was being pushed westward through southern Wyoming with all possible dispatch, and at Cheyenne Mr. Iliff found so excellent a market that his herd of cattle proved better than a gold mine. He found a vast stretch of country reaching from the South Platte River to Wyoming, and from near the eastern base of the Rocky Mountains to Nebraska — a region larger than Massachusetts — occupied only by buffalo and antelope. His mind quickly grasped the possibilities of the situation. From this time on his course was one of steady and rapid progress. He made the cattle business on the plains a study, giving to it his entire attention and his best efforts. He mastered every detail, and as the business developed new phases he was equal for every emergency. The influence of his life upon the pastoral interests of Colorado and the West cannot be overestimated. At the time of his death he owned about twenty thousand acres of pasturage, including some of the finest watering-places and grazing-valleys in the region where his herds roamed. These herds numbered not less than fifty thousand head, from which he marketed an average of about thirteen thousand head per year. No single individual has ever built up or controlled so vast a business in live-stock in this Rocky Mountain country. He was temperate in his habits, loving and true to his family, honest and just in his dealings, a desirable neighbor, and a most useful citizen.

JARED L. BRUSH.

J. L. Brush was born in Claremont County, O., in 1837, so that he is now fifty-four years of age, though he is so hale, hearty, and vigorous that he appears much younger. His parents were in comfortable circumstances, and afforded their son the best opportunity for intellectual training which the schools of that day and locality provided. Being a thoughtful, obedient youth, willing to work and apt

to do, he contented himself with remaining at home, working upon the farm, and doing whatever else seemed to be necessary.

He was twenty-two years of age when the discovery of gold in Colorado created intense excitement all over the country. In common with thousands of young men, he caught the excitement, though his decision did not wholly contemplate mining. He believed that the Rocky Mountain region was opening a wide and inviting field for aspiring young men in various departments of activity. After careful thought and investigation he decided to "go West," and 1859 found him a citizen of what is now the "Centennial State."

At first he engaged in mining, and was the first discoverer of gold in Russell Gulch. His success, however, was not particularly stimulating, though his search for gold was by no means a failure. After mining two years, he purchased a farm and run it, at the same time making two freighting trips annually over the "plains," from Missouri River to Denver. For five years he continued farming and freighting, hauling hay in the winters to the mountain mining-camps for sale. He began, also, at this period, to deal in cattle, and made his first purchases along the Missouri River. He commenced the cattle business in a small way, but gradually enlarged his trade, until now his own herd numbers five thousand, and he has a partnership in sixteen thousand more. His ranches are located in the southeastern part of Weld County, Col. He removed to that county in 1862, and has lived there ever since, his business growing upon his hands from year to year.

In the autumn of 1883, Mr. Brush said to the author, "Less than twenty-five years ago I drove a freight team over the plains." The remark was made to show the marvellous enterprise and progress which a quarter of a century had wrought. It required a good share of pluck to carry freight over the "plains" at that time; for Indians were on the alert with tomahawk and scalping-knife. The United States government was under the necessity of maintaining regiments of soldiers in that region to save freighters and others from Indian massacre. Mr. Brush had the usual experience of pioneers with the Rocky Mountain red men, escaping with his life only because providential events favored him. Even later, in 1867, when he was engaged in the cattle business, and had a ranch only fourteen miles from the spot where Greeley was laid out three years thereafter, the savages made a raid upon his ranch, and killed twelve men, one of whom was his brother. Mr. Brush was absent at the time; had he been at home, he must have shared the fate of his cattlemen; and

we should not have had the privilege of adding his portrait or sketch of his life to our collection.

Mr. Brush is known as a wise, sagacious business man, the artificer of his own fortune, honest, reliable, and influential. He is deeply interested in the welfare of his adopted State, and has represented Weld County several times in the Legislature. He resides at Greeley, where he is respected by all who know him, for his business ability and uprightness of character. For many years his life has been a checkered one, necessarily involving many hardships and struggles; but his industry, tact, perseverance, and honesty have won for him success, and with it the public confidence.

CHARLES LUX.

Charles Lux was one of the most eminent citizens of California, at the time of his death, in the year 1887. He was born in Germany, in 1823, and came to this country when he was fifteen years of age. He cast his lot in New York City, where he became a butcher-boy, and worked early and late and hard, and laid up money. The gold excitement lured him to California in 1850, and he settled in San Francisco, where he continued to work in the butcher's business for one Captain North. From this time, his biographer in the San Francisco *Chronicle* shall describe his career: —

"To him (North) young Lux proved a treasure. He was indefatigable, never seemed to need sleep, never forgot anything, never was in a bad temper.

"They worked together for about a year; then the captain, who shared the roving disposition of most Californians of that day, proposed to sell out to his assistant, and the offer was accepted. The butcher's sign was changed to Charles Lux, and for several years he carried on business there, making money and friends. About 1854 or 1855 he took into partnership a man named Edmundson, who is still alive. They embarked in the wholesale cattle business in a small way and did well. After a year or two, for some reason or other, the partnership was dissolved.

"It was in 1857 that he made his first joint operations with Mr. Miller. They proved profitable, and the two men grew to be intimate. Striking contrasts in many respects, they were alike in many essentials. Both were men of sturdy integrity, close habits of business, and that power of concentration which secures fortune, when more showy gifts, dispersed over a wider range, might fail to obtain

it. Both were Germans. Mr. Miller was born in Gütenburg. In 1858 they formed a partnership under the name of Miller & Lux, which lasted till death dissolved it last week, and during which not one shadow ever darkened the brightness of their friendship. In the previous year a still more momentous change had occurred in Mr. Lux's life. A few years previously a gentleman named Potter was blown up and killed by an explosion on board the San Rafael boat. He left a widow and son. The lady, whose early beauty is still remembered, and the loveliness of whose character is known to all who have the privilege of her acquaintance, consented in 1857 to accept Mr. Lux's addresses, and they were married. It was a happy marriage for him. His wife, a Rhode Islander, and a member of the Presbyterian church, made his home bright; and nothing pleased him better than to place his purse at her disposal for use in the benevolent works in which she has been perseveringly engaged for thirty years. There is hardly a charitable body in the city of which she is not one of the trustees or patronesses; hardly one that is unacquainted with Mr. Lux's checks.

"The first important purchase which they made was part of the Santa Rita ranch in Merced. This was bought in 1863 of Dunphy & Hildred; the amount of land was two Spanish leagues, eight thousand eight hundred and eighteen acres. As the firm's stock of cattle increased, and as neighbors desired to sell, Miller & Lux, who always kept ready money on hand, bought field after field and ranch after ranch, until now the property covers the enormous area of six hundred thousand acres, — a principality.

"About the same time Miller & Lux bought two adjoining ranches, known as the Dequisquito ranch, and the La Marias Muertes ranch, — the one in Monterey, the other in Santa Clara. These were two old Spanish grants, and embraced an area of about twenty-four thousand acres.

"The next purchase made was the Canada de San Lorenzo, in the extreme southern portion of Monterey County. This property is familiarly known as the Peach Tree ranch. Since the first purchase, Miller & Lux have added to it as occasion offered, and it now covers thirty-five thousand acres.

"It was in 1869 that Miller & Lux began the purchases of land in Kern and Tulare counties. The purchases have been followed up by additions ever since, so that now the Kern-Tulare ranch belonging to the firm covers one hundred and fourteen thousand acres.

"These are only some of the lands owned by the firm in this State.

They do not include such properties as Mr. Charles Lux's private ranch of two thousand acres in San Mateo County, or other pieces of land in other counties. Outside of the State Miller & Lux own the Glenn ranch in Humboldt and Washoe counties — a tract of twenty-five thousand acres, on which they have a pretty bunch of cattle. This was bought as long ago as 1860–64. They also bought, in association with a cattleman named Oberfeldt, a tract of twenty-five thousand acres, or thereabouts, in Baker and Grant counties, Oregon. This controls a vast amount of range, and feeds many thousand cattle.

"These purchased lands do not include the leased lands, which cover a large area. The firm pays not less than $20,000 a year for lands which it uses for pasture; one man alone receives $14,000 a year from this source.

"Turning now to the use to which this enormous landed estate is put, it is found that Miller & Lux own more cattle than any one else on this coast, and probably more than Hunter & Evans of St. Louis. No large cattle-dealer can tell how many horned cattle or sheep he owns. He can only form an approximate estimate. Thus, Miller & Lux have been in the habit of reckoning that they owned 60,000 to 75,000 cattle, about 80,000 sheep, 6,000 to 8,000 hogs, and 'several' thousand horses. To take care of these the services of 800 to 1,000 men are permanently required.

"The cattle are brought into the city — a few are sold to country towns — at the rate of about 1,600 a month, and slaughtered here in the three slaughter-houses owned by the firm in Butchertown. Besides steers, Miller & Lux kill 6,000 or 7,000 sheep a month, and about 2,000 hogs. Thus they supply, to feed this city, an average of 52 steers, 200 sheep, and 70 hogs daily.

"It need hardly be said that, with such a business, Mr. Charles Lux died rich. It is very difficult to estimate the value of an estate so large and so widely scattered as his. To administer it successfully requires a great deal of work. There are few men with large amounts of money who are willing to put in the work necessary to conduct such a business. If it were realized gradually, as occasion offered, it would probably be found to be worth something between four and five millions.

"Mr. Lux was always in a good temper, always smiling, with a pleasant word for every one, and his serenity went below the surface. He never broke up a butcher because he could not pay; but, on the contrary, he invariably kept on supplying tradesmen whom he knew to be insolvent, and when he felt reasonably certain that he would

never get paid. He was always on the lookout to help somebody. To the members of his own family in New York and Germany, and to the relatives of his wife, he ever acted the part of a generous, whole-souled father."

R. G. HEAD.

R. G. Head was born in Saline County, Missouri, in 1847, of worthy and honored parentage. When six years old his father moved from Missouri to Caldwell County, Texas. When thirteen years of age young Head entered the employ of Bullard & McPhetridge, drovers, who were preparing to move a herd of cattle to Missouri, receiving thirteen dollars per month salary. The breaking out of the war prevented the drive, and the herd was disposed of to the Confederate government. Between the age of eleven and thirteen he received the benefit of some nine months' attendance at the public schools, which is the sum total of educational advantages enjoyed by him. He remained on his father's farm, or ranch, until about sixteen years old, when he entered the Confederate service, and served until the close of the war. Returning home, he worked one year upon a farm and then entered upon the remarkably successful career which brought him to the position he now holds among the stockmen of our country. He was not quite nineteen years old when he entered the service of Col. John J. Myers, the pioneer drover of Texas, who drove the first herds to Abilene, Kansas, which place was then a mere post, containing but half a dozen habitations. Mr. Head camped a herd of cattle on the spot where the city of Wichita, Kansas, now stands, when not a white man resided there, but as many Indians as there are now white inhabitants. He began his service with Colonel Myers on a salary of $30 dollars per month, which was steadily advanced until the third year, when he took entire control of his employer's trail business at a salary of $1,800 per year and expenses. He continued with Colonel Myers for seven years, during which time he drove herds to Abilene, Wichita, Great Bend, Ellsworth, and Dodge City, Kansas; and also to Cheyenne, Wyoming, Salt Lake, Utah, the Humbolt River in Nevada, and across to California, also to the various Indian agencies on the upper Missouri River and Black Hills country. His business relations with Colonel Myers were terminated in 1873 by the death of the latter gentleman. In 1875 he assumed the general management of the extensive cattle business of Ellison, Deweese, & Bishop, of San Antonio, Texas, handling from 30,000 to 50,000 cattle annually. In the spring of 1878 the last-named firm dissolved, and

CATTLE KINGS.

Mr. Head formed a partnership with Mr. Bishop, member of the old firm above, for the handling of cattle on the ranch and trail. The firm of Bishop & Head existed until 1883, when the prevailing high prices induced Mr. Head to insist upon a sale of the partnership property, which was accomplished over the friendly protest of Mr. Bishop. In May, 1883, he accepted the management of the business of the Prairie Cattle Company, the largest company of the kind in the world.

He filled this position for three years, during which time he marketed from the ranches of the company over 54,000 cattle, netting over $1,300,000, and branded for the company, from its herds, more than 83,000 calves, and after paying all expenses, interest on debenture bonds, and also paying dividends to its stockholders amounting in three years to forty two per cent of the capital invested, left the company with some 5,000 more cattle than when he assumed the management of its business, and an undivided surplus of about $80,000. His salary for his service with this company was $20,000 per annum. When he severed his connection with the Prairie Cattle Company, its employees presented him with a solid silver service, costing $1,500.

In 1886 he was elected president of the International Range Association, representing the live stock industry of the Plains, from the Gulf of Mexico to British Columbia, and west to the Pacific Coast. He was re-elected unanimously to the same position in 1887. He was one of the original promoters of the recently formed American Cattle Trust, and now resides in Denver, Colorado, and is the general manager of the entire ranching interests of that association. He is one of the principal owners in the Phœnix Farm & Ranch Company, of Mora County, New Merico, which is perhaps one of the most desirable and productive, as also the most systematically conducted, properties in that Territory, if not in the entire West.

Mr. Head is also a large stockholder in the Fort Stockton Live-Stock & Land Company, of Texas, comprising 50,000 acres of land, 20,000 of which are under irrigation. The company owns 30,000 cattle and 500 horses. He also owns a farm of above 700 acres, in a high state of cultivation, at his old home, in Caldwell County, Texas.

Mr. Head is married and is the father of two daughters, to whose comfort and happiness, with that of their beloved mother, he is a most devoted husband and father. A busier and more successful life biographers are not permitted to chronicle, nor one that is nobler and purer.

THOMAS H. LAWRENCE.

Thomas H. Lawrence was born at Circleville, Ohio, in 1851. Having obtained the education offered by the common schools, he accepted a clerical position in New York City, and later a position of the same kind in St. Louis, Mo. In 1868 he went to West Texas, where he began the career which brought him into prominence as one of the most intelligent and successful cattlemen of the Plains. After four years of cowboy life, Mr. Lawrence moved a herd by trail to Ellsworth, Kansas, and the following year made his second drive, this time to Nebraska.

In the fall of 1873 he formed a partnership with Wm. C. Irwine, and with him established a cattle ranch near Ogallala, on the South Platte River, in Nebraska, where they placed 800 cattle. This partnership was terminated at the expiration of two years, when Mr. Lawrence joined Messrs. J. H. and G. M. Bosler, under the firm name of Bosler Bros. & Lawrence. They operated a large ranch on the North Platte, and continued in business until 1883, when Mr. Lawrence sold out to his partners. He then removed to New Mexico, where he assumed the management of the Dubuque Cattle Company, in which he is a large owner, and still retains the management. The esteem in which Mr. Lawrence is held by his brother-stockmen is evidenced by the fact that he has been chairman of the executive committee of the Northern New Mexico Stock-Growers' Association since 1883. He is also one of the owners of the Phœnix Farm and Ranch, of Mora County, New Mexico, — the most valuable, and extensive combined farm and ranch in the Territory. It is stocked with 9,000 head of cattle, has 18,000 acres of pasture lands enclosed, and several thousand acres under irrigation and tillage. Mr. Lawrence is married, has two children, and his home at Las Vegas, New Mexico, is that of a gentleman.

JOHN W. SNYDER.

Mr. Snyder was born in Yazoo County, Mississippi, June 21, 1837. He was scarcely three years old when his father died; but he was left in the care of a pious, loving mother, who was obliged to move, first to Arkansas, and then to Missouri, in order to feed and clothe her children. She was brave and true, and John and his brothers were ditto. Hard work and rigid economy kept the wolf of hunger at bay, but left very small opportunities for schooling. John

received about one year of poor log-house schooling up to nineteen years of age.

At nineteen, John and Dudley borrowed money enough to buy a team and load of apples, which they carried to Austin, Texas, six hundred miles, and sold at a good profit. They remained in Texas two years, farming with fair success, then began to drive horses to Missouri for sale, and take back apples to Texas, where they soon removed their mother and settled.

In 1861, John was worth one thousand and six hundred dollars, and he resolved to attend school. But a few months only elapsed when the late civil war broke out, and he enlisted as a private, but was soon promoted to second lieutenant, and then captain. He and his two brothers were among the three hundred volunteers, who, on board two small steamers, attacked the *Harriet Lane* in Galveston harbor, captured that man-of-war, and retook the city. Later, in Louisiana, under General Banks, his horse was shot under him.

Soon after returning from the war, he and his two brothers, Dudley and Thomas, began the cattle trade in company, and this grew upon their hands until it became enormous, and the "Snyde Brothers" became known, not only in Texas, but throughout the New West, for wealth, enterprise, and integrity of character. They fought the Indians, hard times, and mighty obstacles in hewing their way to success.

When Mr. Iliff died, J. W. Snyder & Co. were under contract to deliver 25,000 cattle at his ranch in Colorado. Mrs. Iliff, familiar with their enterprise and integrity, besought them to take charge of the immense herd which her husband left, and in April, 1878, J. W. Snyder assumed that responsibility, and the first year shipped 14,053 beeves for her to market. In the spring of 1881 they purchased the immense Iliff herd, Mrs. Iliff retaining an interest in the business. On Jan. 1, 1887, J. W. Snyder & Co. owned 30,000 cattle, 275 horses, and 20,000 acres of land in Colorado; and 17,000 cattle, 750 horses and 218,000 acres of land in Texas.

Mr. Snyder married in March, 1867, and to-day has an interesting family; and he is never so happy as when he is in their society. He is a consistent and active member of the Methodist Church. It is a common remark that the Snyders believe in carrying religion into their business. They enforce rigid regulations among their cowboys against swearing, drinking, gambling, and Sabbath-breaking. They give away large sums of money. Evidently they act on Wesley's rule, — "make all you can, save all you can, and give all you can." A friend says of John W.: —

"His life is gentle, and the elements
So mixed in him, that nature might stand up
And say to all the world,
This is a man."

JOHN T. LYTLE.

The subject of this sketch was born in Adams County, Pennsylvania, in October, 1844. After acquiring the limited advantages of the public schools of his native State, young Lytle began the battle of life by going to the vicinity of San Antonio, Texas, where he obtained employment as a cowboy in the spring of 1860. After two years' experience he assumed the management of a ranch, but after one year in this position he gave up his peaceful vocation to take part in the war between the States. He enlisted in Company H, Colonel Wood's regiment, Texas cavalry, and served in Louisiana and Texas, until the close of the struggle. He returned to the ranch he had left to become a soldier, and managed it for three years, when he began business for himself, with a few cattle in Frio County, Texas. In 1871 he took the trail with one thousand head of cattle, for his first northern drive. Meeting with success, he was encouraged to follow up the business each succeeding year with largely increasing numbers, until 1878, when he drove twenty thousand head. During these years the herds were accompanied by him, but from 1879 to 1885 inclusive, while he moved thirty-five thousand cattle north annually, he did not take the trail in person. From 1871 to 1885 inclusive, Captain Lytle moved over three hundred thousand cattle from Texas to the North. In 1878 Captain Lytle added the sheep industry to his already large live-stock interests, and his firm has held an average of about forty-five thousand sheep from that date to the present.

Captain Lytle is also one of the largest landed proprietors in the country, being joint proprietor in four large ranches in Texas. The one where he makes his home is at Lytle, Medina County, and contains 20,000 acres, all enclosed, improved, and stocked with blooded cattle. A ranch in Frio County, 40,000 acres, is also fenced and stocked with cattle. One in Maverick County, on the Rio Grande, contains 50,000 acres of patented land, and 350,000 acres of leased lands. The latter is principally devoted to sheep and wool growing, although 16,000 head of cattle are kept there. Captain Lytle also owns with Mr. Schriner a ranch in Mason County, Texas, of 40,000 acres of patented land, all under fence and stocked with cattle. He is one of the most approachable of men, and a general favorite. He resides at Lytle, Texas, and is a widower with two children.

VI. MARVELS OF AGRICULTURE.

WHO has not heard of the cornfields of Kansas and the wheat-fields of Dakota? Not that all the mammoth fields of corn and wheat are found in these localities; for the New West, clear to the Pacific coast, challenges the world to survey its empire of golden grain. Contrary to the expectations of a quarter of a century ago, the States and Territories along the Missouri, and beyond, yield marvellous harvests. Daniel Webster said that wheat could never be produced in paying quantities in California. For years, the reports of remarkable harvests in that distant portion of our country were not believed in the East. Thirty and sixty bushels of wheat, and seventy-five of corn, to the acre, was simply a "Western lie." Eastern farmers, accustomed to raise a few acres of grain, — five, ten, perhaps twenty acres, — contemptuously sneered at the newspaper report of ten thousand acres of corn and wheat on a single farm. "The spring is too short for so much planting and sowing." "Couldn't gather half of it in the autumn months." "Couldn't sell so much for ten cents a bushel." "Speculators get up these stories." "Tell it to the marines." The reports were too big for belief. Stories of half the size, though expressing only half the truth, might have been accepted. The delighted Irishman, who asked his employer to write a letter for him to his old father in Ireland, said: —

"Write him that I have meat to eat once a day."

"Why, Pat; you have meat three times a day," replied his employer, "and why write that you have it but once?"

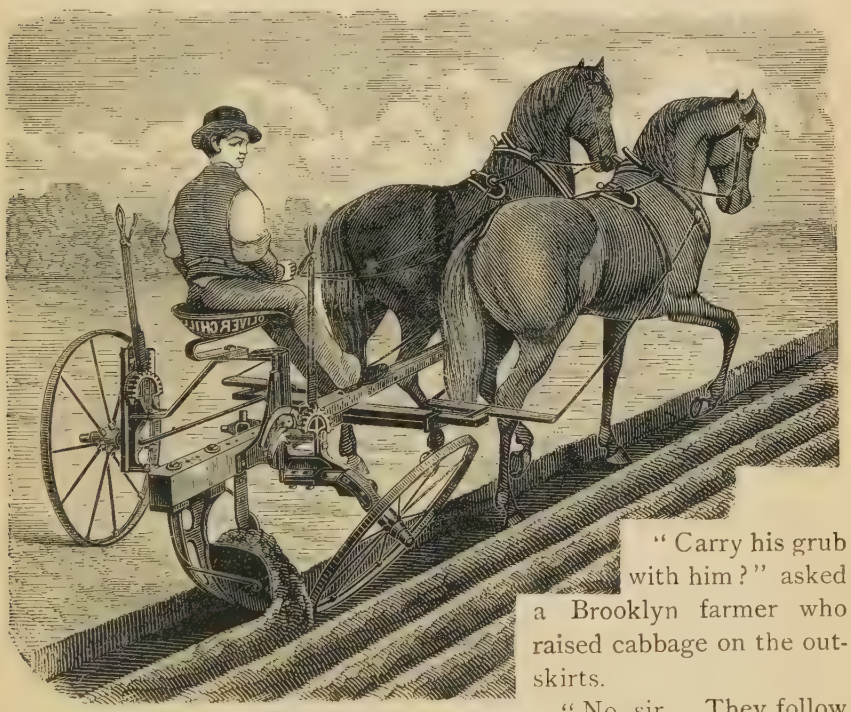
"Faith, sir, it is too much for them to believe. If I say that I have meat once a day, they may believe; but if I say three times a day, they will say it's Pat's fabrication."

So the letter went telling the old father that his son in "Amerika" had meat once a day; and it was true as far as it went. It was so much nearer the state of things in Pat's native land that it challenged belief.

So it was with the marvels of agriculture in the New West a generation ago. They presented so great a contrast with the agri-

culture of the East that credulity could not span the chasm. If the reports had been half the size they might have been believed. As it was, caricature and burlesque modified even the facts that were generally accepted, after the manner of the following: —

"Yes, sir," resumed the Dakota man, as the crowd of agriculturists drew back from the bar and seated themselves around a little table, "yes, sir, we do things on rather a sizable scale. I've seen a man on one of our big farms start out in the spring and plough a straight furrow until fall, then he turned around and harvested back."



SULKEY PLOUGH.

"Carry his grub with him?" asked a Brooklyn farmer who raised cabbage on the outskirts.

"No, sir. They follow him up with a steam hotel and have relays of men to change ploughs for him. We have some big farms up there, gentlemen. A friend of mine owned a farm on which he had to give a mortgage, and I pledge you my word the mortgage was due on one end before they could get it on record at the other. You see it was laid off in counties."

There was a murmur of astonishment, and the Dakota man continued: —

"I got a letter from a man who lives in my orchard just before I

left home, and it had been three weeks getting to the dwelling-house, although it had travelled day and night."

"Distances are pretty wide up there, ain't they?" inquired a New Utrecht agriculturist.

"Reasonably, reasonably," replied the Dakota man. "And the worst of it is, it breaks up families so. Two years ago I saw a whole family prostrated with grief, — women yelling, children howling, and dogs barking. One of my men had his camp truck packed on seven four-mule teams, and he was around bidding everybody good by."

"Where was he going?" asked a Gravesend man.

"He was going half-way across the farm to feed the pigs," replied the Dakota man.

"Did he ever get back to his family?"

CORN IN THE KAW VALLEY, KANSAS.

"It isn't time for him yet," returned the Dakota gentleman. "Up there we send young married couples to milk the cows, and their children bring home the milk."

But time has not only vindicated the reports, but proved also that the half was never told. The wildest dream has become reality. The biggest story is not too large for belief. The bigger the better. The pendulum has swung to the other extreme. Nothing is too large for belief. Twenty and even thirty thousand acre farms, and a hundred bushels to the acre, is not an extravagant story now. Corn eighteen feet high, with ears long and heavy enough for a policeman's club, is not questioned now even by the uninitiated. Harvests like an army with banners, waving their golden plumes above the house which the farmer occupies, require no stretch of the imagination to realize.

We have seen Kansas corn several feet higher than the dwelling which the owner occupied. The stocks were marvellously stout as compared with Eastern corn, and seemed to defy ordinary methods of harvesting. An axe appeared as necessary to lay that field of corn flat as in gathering a crop of hoop-poles. Indeed, we should be as hopefully inclined to feed cattle with moderate-sized hoop-poles as with the stock of that corn.

The newspapers teem with items now that would have been treated as wholly unreliable thirty years ago. Here is a sample: —

"A stalk of corn twenty feet high, and bearing thirteen well-developed ears, is reported to have been grown at Encinitas, Cal., this season."

"A Nevada pear tree, with a trunk only one inch in diameter, bears forty pounds of fruit."

"Remi Nadeau, of Los Angeles Co., the largest vine planter in California, has set out about 100,000 vines this season, and is waiting for more rain to increase the number. He and his sons have now between three and four million vines, and are the largest grape growers in the world."

"The *Healdsburg* (Cal.) *Enterprise* reports that last March Mr. H. O. Ludolff's hired man cut off a cutting from a grape-vine and stuck it in the ground for mere sport. About a month ago he called the attention of Mr. Ludolff to it, and he was surprised to see that it had grown seven feet high and bore grapes. The bunches were of immense size, and every bit as good as the original stock."

"An Oregon man lives in a room which he hollowed out in the stump of a big tree. It has doors and windows, and answers the purpose of a house."

"In California alfalfa is cut four and five times in the season, and averages from two and a half to two tons at each cutting, or from eight to ten tons per acre for the season."

"In Placer Co., Cal., is an orange cling peach tree grown from a dormant bud, one year's growth, with stem an inch and a half in diameter, and standing thirteen feet high. Also, a late October peach grown in the same manner from bud this season, standing twelve feet high.

"Messrs. Mitchell and McGindley exhibit a turnip which weighs twenty-one pounds, and measures two feet and three inches in circumference."

"The largest squash ever raised in western Colorado was produced the past season on North Fork, in Delta Co. Its weight was 168 pounds."

"Mr. P., a neighbor about a mile and a half from the ranch, had planted, in soil turned that year for the first time, part of one ear of pop-corn from which he raised a crop that filled two barrels. A single kernel fell by accident into a potato hill about sixty feet distant from where the rest was planted, and produced a stock from which were picked *seventeen ears* of corn, on which, by actual count,

MILLET — SIX WEEKS' GROWTH.

there were found *six thousand five hundred and eighteen kernels.*"

A Colorado farmer writes: "I raised three wagon loads of squashes on one-twelfth of an acre.

"From my own garden I raised 2,240 bushels of beets per acre. Also, 80 bushels of beans per acre.

"From 1,000 to 1,200 bushels of parsnips per acre may be raised. I have them two and a half feet long."

"California sent to the grand exposition at New Orleans, in 1885, a squash three feet long and two feet in diameter, weighing 165 pounds; early rose potatoes nine inches long and four in short diameter, weighing from two to three pounds each; a watermelon three feet long and two feet in diameter; beets weighing forty pounds apiece, cabbages sixty pounds each, and peaches so large in size that four average ones weighed three pounds."

"The Denver exposition shows a cabbage

weighing eighty pounds, a pumpkin two hundred and twenty pounds, parsnips three feet long weighing twenty pounds, a beet sixty pounds, and onions weighing from six to eight pounds apiece."

"Kansas boasts of corn eighteen feet high, and oats and millet ten feet."

The foregoing remarkable facts are illustrations of what we read in public journals, almost daily, concerning the agriculture of the New West. We say *facts*, for facts they are, and not falsehoods. They have begotten "great expectations." From believing little of the reports a quarter of a century ago, people have come to believe them all, and ask for more marvels still. It is recorded in the Agricultural Bureau at Washington that the largest yield of wheat ever known in the whole world was grown in Salinas Valley, Monterey County, California, in 1852. The yield was one hundred and two bushels to the acre. Who can believe this fact, can believe all the possibilities of western agriculture.

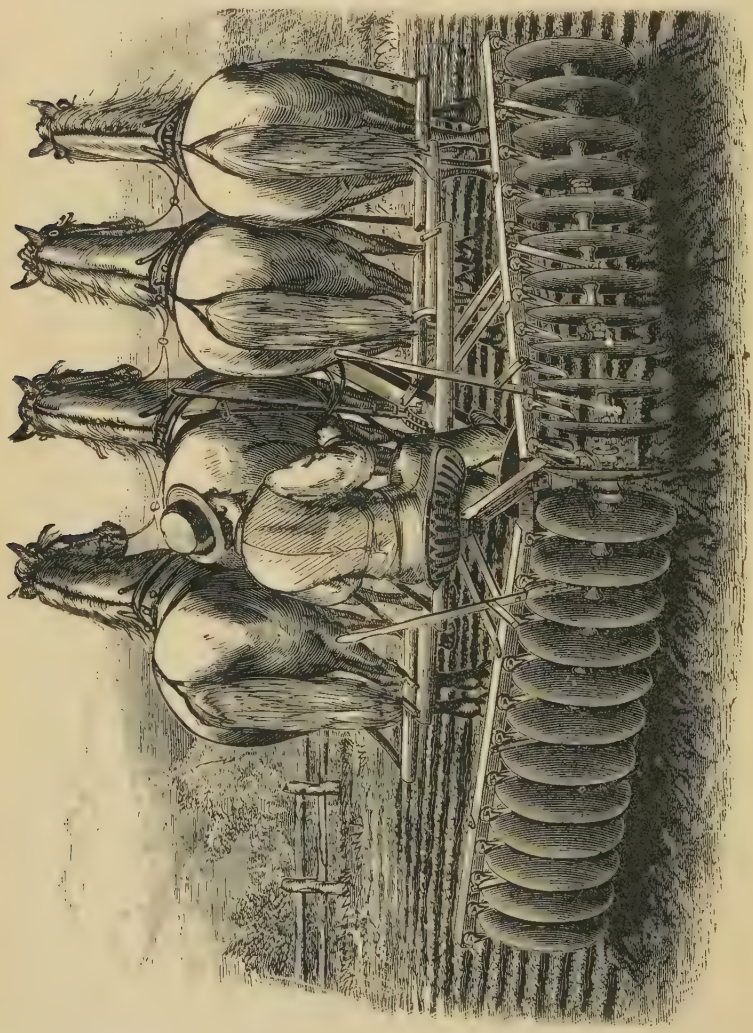
Turn now to the methods of agriculture in the New West, and behold how the boundless prairies are converted into gardens by enterprise and tact.

In 1880 the United States stood at the head of nations in agricultural and pastoral products, their value being $3,020,000,000. Without the New West this creditable position would not have been attained. Russia stands next in the list, the value of her agricultural products being $2,545,000,000. Then Germany, with $2,280,000,000. Next France, with $2,220,000,000. Next Austria, with $322,000,000. Great Britain is the sixth in the list, from her comparatively small area producing $1,280,000,000 in value.

One-fourth of all the wealth of the United States is employed in the cultivation of the soil. There are more than 4,000,000 farms, a majority of them being run by their owners. Over 3,500,000,000 bushels of grain were produced in 1891, the New West growing the larger part. The invention and multiplication of labor-saving machines has made this production possible. In 1830 the value of machinery used in agriculture was $150,000,000; it is now $600,000,000.

It is estimated that there are 785,000 square miles of arable lands west of the Mississippi, 645,000 of grazing lands, 260,000 of timber lands, and 425,000 that are useless. There are nearly twice as many acres of arable land west of the Mississippi as there are east of it. The proportion is estimated thus: 1,690,000 west, and 800,000 east.

Mr. Carnegie[1] strikingly puts the facts in the case as follows: "The farms of America comprise 837,628 square miles, an area nearly equal to one-fourth of Europe, and larger than the four greatest European countries put together (Russia excepted), namely,



KING OF HARROWS.

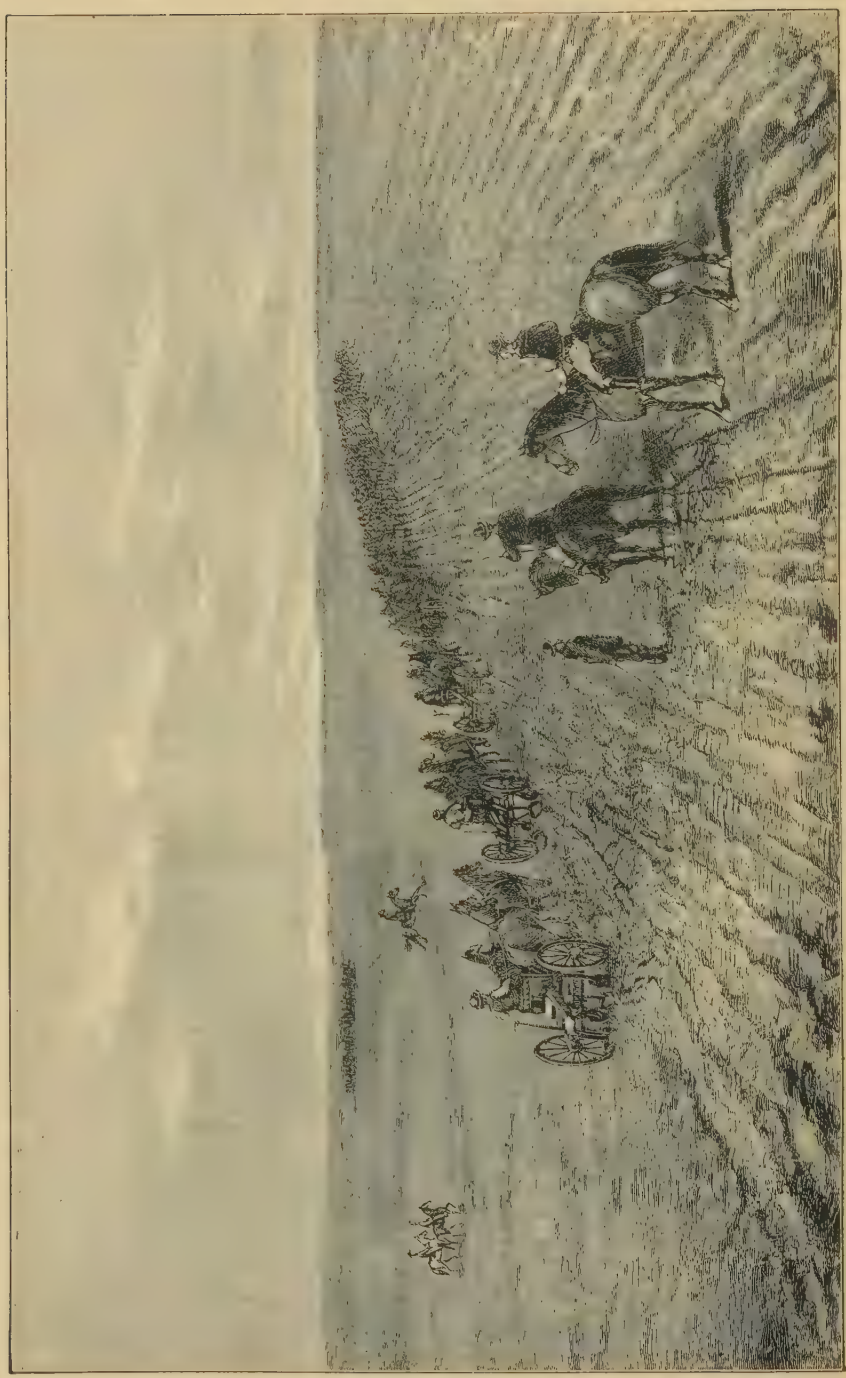
France, Germany, Austria and Hungary, and Spain. The capital invested in agriculture would suffice to buy up the whole of Italy, with its rich olive-groves and vineyards, its old historic cities, cathedrals and palaces, its kings and aristocracy, its pope and cardinals,

[1] Triumphant Democracy, p. 199.

and every other feudal appurtenance. Or, if the American farmers were to sell out, they could buy the entire peninsula of Spain, with all its traditions of mediæval grandeur, and the flat lands which the Hollanders at vast cost have wrested from the sea, and the quaint old towns they have built there. If he chose to put by his savings for three years, the Yankee farmer could purchase the fee-simple of pretty Switzerland as a summer resort, and not touch his capital at all; for each year's earnings exceed $550,000,000. The cereal crop of 1880 was more than 2,500,000,000 bushels. If placed in one mass, this would make a pile of 3,500,000,000 cubic feet. Built into a solid mass as high as the dome of St. Paul's (365 feet), and as wide as the cathedral across the transepts (285 feet), it would extend, a solid mass of grain, down Fleet Street and the length of the Strand and Piccadilly, thence on through Knightsbridge, Hammersmith, and South Kensington, to a distance of over six miles. Or it would make a pyramid three times as great as that of Cheops. If loaded on carts, it would require all the horses in Europe and 1,000,000 more (33,500,000) to remove it, though each horse drew a load of two tons. Were the entire crop of cereals loaded on a continuous train of cars, the train would reach one and a half times around the globe. Its value is half as great as all the gold mined in California in the forty-three years since gold was found there. The corn and cotton-fields of America form kingdoms in themselves, surpassing in size some of those of Europe."

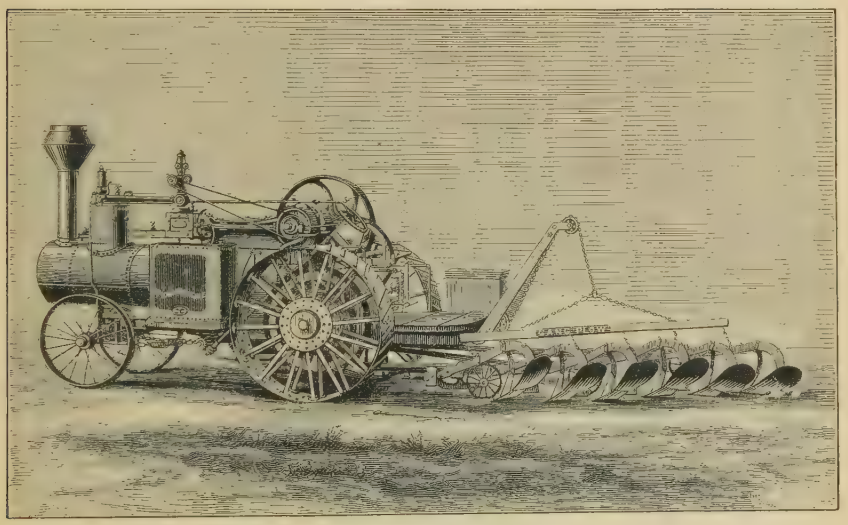
Distribution of Land Areas throughout the New West.

STATES AND TERRITORIES OF THE NEW WEST.	LAND IN FARMS.			LAND NOT IN FARMS.	TOTAL LAND AREA.
	IMPROVED.	UNIMPROVED.	TOTAL.		
Kansas	107,39,566	10,677,902	21,417.468	30,870,532	52,288,000
Nebraska . . .	5,504,702	4,440,124	9,944,826	38,813,574	48,758,400
Oregon	2,198,645	2,016,067	4,214,712	56,303,688	60,518,400
Washington . .	484,346	925,075	1,409,421	41,393,779	42,803,200
Colorado . . .	616,169	549,204	1,165,373	65,167,427	66,332,800
Utah	416,105	239,419	655,524	51,946,076	52,601,600
Wyoming . . .	83,122	41,311	124,433	62,323,567	62,448,000
Montana . . .	262,611	143,072	405,683	92,592,717	92,998,400
Idaho	197,407	130,391	327,798	53,617,802	53,945,600
Nevada	344,423	186,439	530,862	69,702,738	70,233,600
Arizona	56,071	79,502	135,573	72,133,227	72,268,800
Dakota	1,150,413	2,650,243	3,800,656	90,727,344	94,528,000
New Mexico . .	237,392	393,739	631,131	77,743,269	78,374,400
California . . .	10,669,698	5,924,044	16,593,742	83,233,458	99,827,200
Totals	32,960,670	28,396,532	61,357,202	886,569,198	947,926,400



PLOUGHING ON A BONANZA FARM.

The illustration informs the reader at once how a farm of twenty or thirty thousand acres is ploughed. It is divided into sections, with superintendent and army of employees for each section, who go to work with military precision and order. The cut opposite represents two sections of workers, one of them in the distance, each moving forward like a column of cavalry, turning over a hundred acres of soil in an incredibly brief period of time. The superintendent is accompanied by aids, furnished with all the necessary tools and materials for making repairs speedily, so as to reduce delays to the least possible minimum. Under this arrangement the earth is easily conquered by this mighty army of ploughers, who move forward to the music



STEAM GANG PLOUGH.

of rattling machines and the tramp of horses. It is an inspiring spectacle, — the almost boundless prairie farm and the cohorts of hopeful tillers marching over it in triumph.

Steam also reinforces the battalions of workers on many bonanza farms, largely multiplying the amount of labor performed.

The process of harrowing an extensive wheat-field is like that of ploughing, the plough being exchanged for the harrow. The superintendent, on horseback, leads the harrowing cavalcade, as the general does his army, and between the tramp of steeds and tear of harrows, the soil is pretty thoroughly pulverized. Workmen say there is peculiar fascination in this method of subduing Western land on a large scale. Men forget the burden of toil in the excitement of the hour.

"Many hands make light work" is an old proverb; but it is full as true that many hands make merry work. Drudgery becomes no part of the labor. It is not really "hard work," nor "wearing work." There is so much sociability as well as novelty in the methods that no one is disposed to complain of "hard" work. Nor do they tire of the business as Eastern farmers, working early and late to support their families, often tire. They behold the reward of labor in the

HARROWING ON A BONANZA FARM.

rich, loamy furrows, and are satisfied. It is three and four months before harvest, yet they see the thousands of acres of waving grain, the grandest spectacle upon which their eyes ever feasted. Says one who speaks from personal observation: —

"After all, the most magnificent sight presented to the traveller is the almost boundless expanse of tall, waving wheat in North Dakota. Look out for eight, ten, or twenty miles, as far as the average human sight can pierce the distance, and view the luxuriant, stalwart grain swaying in the breeze and glittering in the golden sunlight like the

coruscations of a soaring imagination, and if anything is lacking to complete the sublimity of the picture, compute the pile of golden eagles, or greenbacks, the alchemy of harvest will transmute into the pockets of the lucky owners of these Western bonanzas."

The author of "California, the Cornucopia of the World," has communicated so much information upon seeding wheat in that State, in a brief article, that we copy it entire. The difference between the seasons in California and some other portions of the New West is set forth by the writer: —

SEEDING ON A BONANZA FARM.

"We have heretofore alluded to the fact that the seasons in California are so favorable to putting in grain that one man can put in much more there than in countries where the seasons are less favorable. By good management every farmer has a good portion of his land intended for wheat summer-fallowed. This he sows before the rain begins, say in September. The seed comes up with the first rain, and makes a large growth in the warm, pleasant, fall weather, which is as fine growing weather as any April or May weather.

"Then, when enough rain has fallen to moisten the soil sufficiently

to plough stubble corn or new land, the teams are set to work putting in these kinds of lands to wheat. This is called winter-ploughed wheat. The ground being smooth, and soil entirely free of stone and deep and mellow, gang ploughs are used. Some use two and some three gangs, and where the fields are large and the soil in good condition and level, as high as eleven ploughs to the gang are used. Four horses are used on a two-gang plough, and six on a three-gang, and so increasing the number of horses to the number of ploughs in the gang, using twelve horses on eleven-gang ploughs.

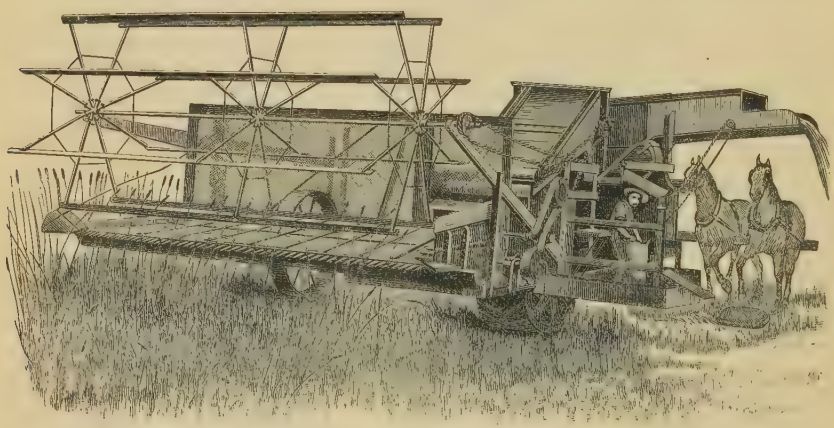
"The ploughs in the gangs, when so many are used, are generally smaller ploughs, say cutting a furrow eight and ten inches. Connected with the plough or gang of ploughs is a seed sower that sows the seed in front of the plough, and a harrow behind and attached to the plough, so that as the machine moves along the whole operation of ploughing, seeding, and harrowing is performed and completed. No matter how many ploughs in the gang or how many horses, one man attends to and manages the whole thing. It is always calculated that the number of acres thus ploughed and sown in a day should be equal to the number of horses employed. Thus, with six horses six acres are sown, with eight horses eight acres, and with twelve horses twelve acres are put in in a day. Thus it will be seen that one man with twelve horses can, in one month of twenty-six working days, put in 312 acres. We have heretofore stated that our seed time for wheat is from September to April, eight months. At 312 acres to the month, one man can thus put in 2,496 acres. Now, in this connection it must be remembered that all this labor, this important and money-making labor, is performed in the rainy season of California. It must also be remembered that the rainy season in California, as we have already explained, is not a season of continuous rains, as many have supposed. Sometimes it rains most of the time for two or three days, but more generally the farmer can work in the field the whole season through and not lose more than four or five days in the whole time."

"Necessity is the mother of invention;" and so the wheat-raisers found a way of harvesting their enormous crops. Our forefathers used the sickle, a very slow and unsatisfactory method of gathering grain. Less than a hundred years ago the "cradle" for cutting grain was invented by a Scotchman, and this created a revolution in harvesting. It facilitated the autumn work of the farmer to such a degree that he never dreamed there could be any improvement upon that method. But even the "cradle" could not avail much on the

HARVESTING ON A BONANZA FARM.

vast wheat-fields of the New West. Think of Dalrymple cradling thirty thousand acres of grain! One hundred men could cradle but three hundred acres per day at the most; and one hundred days, at this rate, would be required for harvesting. This would "cost more than it comes to." Western farmers could not afford the expense. It was absolutely necessary that some other method of harvesting grain should be discovered, and it was. A machine for cutting, binding, and placing the bundles in an upright position met the needs of the hour. The problem of harvesting the largest fields of grain was solved by this invention.

A romantic Western story was told about this machine last season. A young lady was intently watching its operation, when, in



STEAM HEADER.

her eagerness to comprehend the process, she ventured too near its enfolding arms, and was taken up by them, as the grain was taken up, bound, and deposited on her feet. Being about the size of a bundle of grain, she passed through the process unhurt, and found herself standing upon her feet with no change except an additional neat little band about her waist.

The writer, who has spoken to us of California from personal observation, speaks as follows of harvesting wheat and the use of the header: —

"It must be remembered that there is no rain from the first or middle of May to the first or middle of October; the seasons vary a little as to the close of the rainy season and the beginning of the dry. As a rule, the wheat in California is cut with a header. On some of the small farms the farmers unite together and purchase a header

and alternate in the use of it. In other cases, farmers hire their grain cut by the acre by men who own headers, and make it a business to go from farm to farm during the harvest time. The general practice now is to have the grain cut and threshed at the same time, and by a man who owns and mans and works both a header and steam thresher. These cutting and threshing rigs are complete. They find all the teams and all the help, and move a kitchen and kitchen fixtures all on wheels along with them. They take contracts to cut and thresh wheat or other grain at so much an acre, bushel, or cental, doing all the work and finding everything, leaving the farmer nothing to do but receive and take care of his sacked wheat, and his wife no more care or trouble during harvesting and threshing time than at any other season of the year. The price per acre varies in accordance with the demand for labor and the character of the grain, but runs from seventy-five cents to a dollar and a quarter.

"The wheat that is standing in the field in the morning is found in sacks, and frequently at the shipping depot, ready to be put on the steamer or cars for market before night. We have known it to be carried to mill and returned to the farm in the form of flour, and cooked, so that the hands who cut it in the morning ate it at supper in the form of warm biscuit. We have in the San Joaquin valley, working successfully, combined headers and threshers. These machines move before the horses, — from twenty to twenty-four horses or mules to each machine, — cut and thresh and sack the grain, and leave the sacks in piles. Four men work them, and cut and thresh from twenty-five to forty acres a day, depending on the favorableness of the ground and the grain. If the farmer is busy when his wheat is threshed, and cannot well carry his wheat to the barn or storehouse or depot, all he has to do is to pile his sacks up in the field, cover them with straw, and let them lay there two or three months, or till he can conveniently move them. The clear blue sky is a guaranty against any damage from the weather, and the no-fence law is a guaranty that no stock shall interfere with it. The advantage secured to the farmer in sowing and harvesting his wheat, is, of course, secured to him in sowing and harvesting all other kinds of grain.

"But one word now in reference to spring and winter wheat. We have no such distinction in California. It makes no difference where our seed comes from, or whether it bears the name of winter or spring wheat. Grown in California it simply becomes California wheat, and in Liverpool, or any other market in Europe, it is quoted

white wheat, and bears the highest quotations. We change our seed from time to time from one locality to another, or import seed from other States, to gain the advantages of such changes, but our crops bear in all cases the ear mark of the California climate. We have probably said enough to convince the reader that California can raise wheat cheaper than any other country, and to explain why the ratio of production in California is ten bushels for each man, woman, and child engaged in agricultural pursuits to one bushel for each man, woman, and child engaged in the same pursuits in Illinois, or any of the other States east of the Rocky Mountains. But we have one other advantage to speak of, and then we will leave this particular branch of the subject. It is found by actual statistics that the aver-

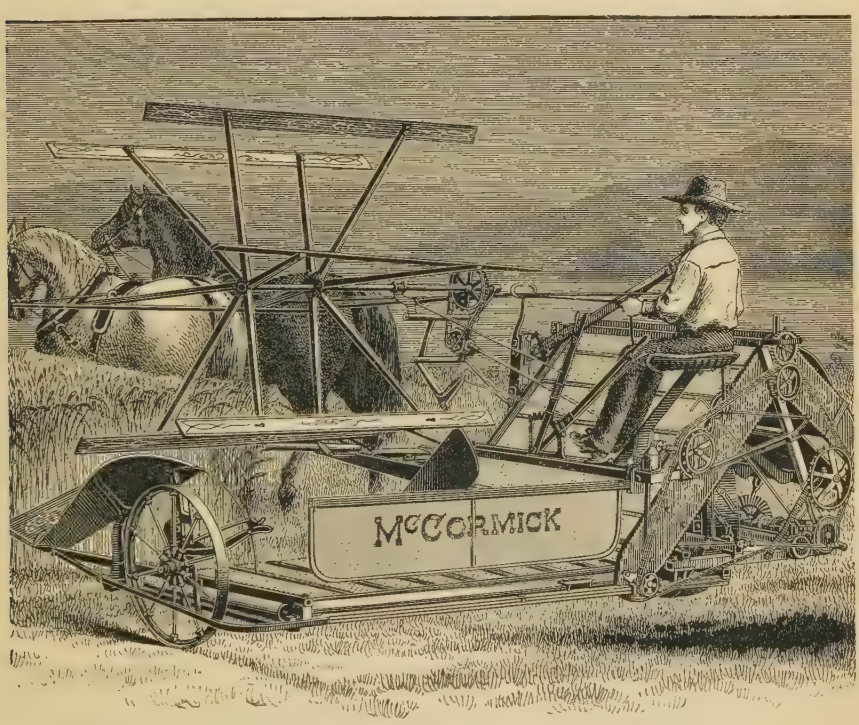
THE STEAM THRESHER.

age yield per acre in California is two-fifths more than the average yield per acre on the eastern side of the continent."

This cut shows the steam thresher of which our California informant speaks. What he says about the rapidity with which the work is done — wheat cut in the morning appearing in hot biscuit at night — may seem as fabulous to the reader as any of the reports burlesqued thirty years ago. But the writer of the foregoing is perfectly reliable, and speaks officially, too.

Eastern farmers cannot understand how it is that North Dakota, with its cold, piercing winters and terrible blizzards, and summers swept by cyclones, can produce more wheat per acre than even California. A scientist explains the matter as follows: "The qualities of climate which bear on wheat-raising in North Dakota, and con-

tribute more regularly, uniformly, and efficiently to the growth of the crop than any found in more southerly climes, are, more daily sunshine, — the days, by reason of the higher altitude, being longer, — cool nights which always favor the cereal crops, deep frosts which gradually melt and supply moisture to the growing plant, less intense heat during the maturing months, fewer injurious caprices of weather at the critical period of growth, and natural climatic conditions which render possible the production of hard spring wheat, — a cheap crop,



McCORMICK'S NEW REAPER.

by reason of its being a quick crop of only about one hundred days from seeding to maturity."

The prevailing westerly winds, called "Chinook," extend to the inland plains of the northern Pacific country, and sensibly modify the climate.

In New England the farmer waits for the frost to quit the earth before he undertakes to seed it. But in Dakota, and all the region which the Northern Pacific Railway has opened for settlement, the farmer plants and sows as soon as the warm sun of March has

melted three or four inches of the six feet of frost in the soil. The frost continues to melt after the earth is seeded, affording moisture and heat from beneath, to the great advantage of all cereals. Like the underground irrigation of California, this process of dissolving the frost slowly turns out to be one of the finest arrangements of nature for growing wheat rapidly and plentifully.

Eastern people who feel the cold chills creeping over them whenever they think of Oregon and Washington Territory, to say nothing of Montana and Idaho, will be both surprised and instructed by reading the following: —

"West of the Cascade Range the winters are rainy, rather than cold. The average temperature for spring is 52°; for summer, 67°; for autumn, 53°; and for winter, 38°; showing a mean deviation of only 29° during the year. The winter, or rainy season, begins about the middle of October, often later, and ends about the first of May. The rains are more copious in December, January, and March.

"Since the settlement of the country by white men, beginning with Lewis and Clark's expedition, in the early part of the century, no storm has done material damage in the region west of the Rocky Mountains, north of California.

"In Western Oregon and Washington Territory, whenever the thermometer falls a few degrees below the freezing point, the weather is usually bright and pleasant, with heavy white frost at night. The frosts that occur in spring, which in other lands would be severe enough to injure fruit and other crops, are commonly followed by heavy fogs from the ocean. The humidity of these fogs dissolves the frost before the sun can strike the vegetation, so that no harm is done by it. This moist atmosphere keeps the grass perennially green on the coast, and it is not unusual for flowers to bloom in the open air the winter through.

"Ice is seldom sufficiently thick to be cut for use, and skating is a rare pastime. The spring opens so early that the farmer sows his seed, and the fruit trees and wild flowers are in bloom, when in latitude from four to six degrees further south, on the Atlantic coast, the rigor of winter is still unrelaxed.

"East of the Cascade Mountains, it must be remembered, the climate and natural features of the country are very different from those of the great basin lying west of them, so that the popular divisions, Eastern and Western Oregon and Washington Territory, are warranted.

"In the eastern section the thermometer is much higher in sum-

mer and lower in winter than in the western section. The rain-fall is only half as heavy. From June to September there is no rain, the weather being perfect for harvesting. The heat is great, but not nearly so oppressive as a much lower grade would be in the Eastern States, and the nights are invariably cool.

"The winters are short, but occasionally severe. Snow seldom falls before Christmas, and sometimes lies from four to six weeks, but usually disappears in a few days. The so-called 'Chinook,' a warm wind, is of great benefit to the country; it blows periodically, and melts deep snows in the course of a few hours. This warm atmosphere is caused by the passage of the wind across the Japan current.

"In Eastern Oregon and Washington spring begins in February, with warm, pleasant weather, and lasts until the middle of May. At this season rain falls in sufficient quantity to give life to vegetation and ensure good crops. The average temperature is 52°.

"Autumn weather in October and November is generally delightful. There is often frost by night, but the days are usually warm and bright. The season is marked by showers, and also by thunderstorms in some localities. The mercury ranges between 55° and 70°.

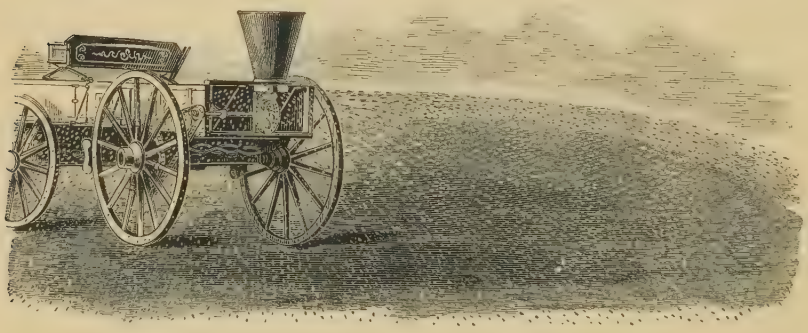
"The rain-fall of the year does not average more than twenty inches. South of the Snake River it is not more than fifteen inches, increasing gradually to the northward.

"Paradoxical as it may seem, if the rain were greatly in excess of this low average, damage would certainly ensue; and it is equally sure, if successful farming depended upon the limited rain-fall, there would be poor harvests. The clouds supply only in part the moisture which is needed. The warm-air currents, surcharged with vapor, which sweep inland from the ocean up the channel of the Columbia River, prevent drought. The effect of these atmospheric currents in tempering the climate has already been described. Their influence upon the vegetation is no less vital. The moisture with which they are laden is held in suspension during the day, diffused over the face of the country. At night it is condensed by the cooler temperature, and precipitated in the form of a fine mist on every exposed particle of surface which earth and plant present. The effect is that of a copious shower. This is apparent on taking a morning walk through the grass, which can only be done at the cost of wet feet. In this region it is no unusual phenomenon for a smart shower to fall when clouds are invisible and the sun is shining. This occurrence is explained also upon the theory that the vapor in the atmosphere comes

in contact with an upper current of cold air, which causes rapid condensation and consequent rain. A summer drought, therefore, which in most climates is a calamity, is here a benefit. The soil needs no more rains after those of the spring are over, and the farmer may depend upon cloudless skies at harvest time. For example, the wheat crop of Eastern Washington in 1883 was 6,500,000 bushels, and no rain fell between May and September.

"The ordinary harvest time for wheat is from June 24 to Sept. 10; for oats, from July 13–20; for barley, from June 20 to July 1; for rye, from July 1–10; for corn, from Aug. 20 to Sept. 10.

"Barns and sheds for keeping the grain, which are indispensable in other countries, are scarcely needed east of the Cascade Moun-



BROADCAST SOWER.

tains. The grain is threshed in the fields by machinery, and thence sent in sacks directly to warehouses for storage or exportation."

And this is that portion of our land which was marked, on the maps of our boyhood, *lands unfit for cultivation.* Then, before actual experiment had disproved the conclusion, the existence of "bunch grass" was proof of sterility; but now it is proof of fertility.

We have heard a great deal about the "bad lands" of Dakota; but these lands constitute but a small fraction of the Territory, — only ninety-five thousand acres out of ninety-four million five hundred twenty-eight thousand. And these lands are not so "bad" after all; for these lands are extensively used for grazing, and Mr. G. V. Smalley of St. Paul, who speaks after careful examination, says, "Cattle come out of the bad lands in the spring as fat as though they had been stall-fed all winter." Surely there is much poorer land than that in New England. The United States Surveyor-General says, "The

proportion of waste land in Dakota, owing to the absence of swamps, mountain-ranges, overflowed and sandy tracts, is less than in any other State or Territory in the Union."

The opinion prevails that there is much worthless land in Utah. It is true to a certain extent, but the quantity of worthless land in that Territory is much less than people suppose. The Surveyor-General of the Territory says: "Notwithstanding the opinion of many who deem our lands 'arid, desert, and worthless,' these same lands, under proper tillage, produce forty to fifty bushels of wheat, seventy to eighty bushels of oats and barley, from two hundred to four hundred bushels of potatoes to the acre, and fruits and vegetables equal to any other State or Territory in quantity or quality."

MAP SHOWING GEOGRAPHICAL CENTRE OF THE UNITED STATES.

Geographically, Kansas is the "hub" of the American Republic. An able journalist says: —

"Kansas lies between the thirty-seventh and fortieth parallels of latitude, the district which, the world round, controls the destinies of the globe, and the time will come when this State will be the powerful centre of the most powerful nation on earth. In 1790 the centre of population in the United States was in Maryland, on the thirty-ninth parallel, and at every census it has moved westward very nearly along that line, until now it is just west of Cincinnati and on its way to Kansas. The thirty-ninth parallel, which has been the thread upon which, as on the necklace of the world, have been

strung the jewels of wealth, culture, plenty, luxury, and refinement, passes directly through the State of Kansas, through the fertile Arkansas Valley."

The Commissioner of Immigration furnishes a map to prove beyond controversy that Kansas is the central State of the Union. He says: —

"The geographical centre of the United States is located near Fort Riley, not far from the centre of Kansas, and near the place where Coronado first crossed the Kansas River. Take a map of the United States and fold it both ways, — fold the ends together and crease it through the middle; then place the top and bottom edges together, and crease the map again. It will be found that the creases will cross in Kansas, as is shown by the lines drawn at right angles to each other through the middle of the map on the preceding page. With the point where these lines cross as a common centre, describe circles including parts, or all of the United States, and the central location of the State will at once be apparent. The same circle which passes through Boston passes through San Francisco."

Reference to the centre of population in 1790, by the writer just quoted, adds interest to the following table: —

"It is claimed that the centre of population has moved westward at the rate of fifty miles for every ten years, since 1790, which is five miles a year.

In 1790 the centre of population was				22 miles east of Baltimore.
1800	"	"	"	17 miles west of Baltimore.
1810	"	"	"	40 miles northwest of Washington.
1820	"	"	"	16 miles north of Woodstock, Va.
1830	"	"	"	19 miles west by southwest of Mooland, W. Va.
1840	"	"	"	16 miles west of Clarksburg, W. Va.
1850	"	"	"	23 miles southeast of Parkersburg, W. Va.
1860	"	"	"	20 miles south of Chillicothe, O.
1870	"	"	"	48 miles east by north of Cincinnati, O.
1880	"	"	"	8 miles west by south of Cincinnati, O.

It is a significant fact that corn is king in the pivotal State of the Union, though only eight million of its fifty-two million acres are under cultivation. If the State were as thickly populated as England, it would contain thirty-five million people, — five times as large a population as would be necessary to bring every acre of its arable land into a high state of cultivation. If a million and a quarter of inhabitants cultivate eight million acres, six million of people will bring the whole area under the plough and harrow.

Corn became king in Kansas in 1883. In 1860 the farmers of that State raised but six million bushels of corn; in 1883 they raised one hundred seventy-two million bushels, and thereby stepped to the front. Moreover, this vast yield of corn was mostly sound. The "Report of the United States Department of Agriculture for March, 1884" says that "Kansas, in 1883, raised sixty-two million more bushels of 'merchantable corn' than did any other State of the Union." Said report furnishes the following very instructive tables: —

Sound Corn.

	Bushels.		Bushels.
Oregon	106,026	Indiana	46,853,800
Dakota	1,867,721	Texas	57,463,133
Michigan	3,854,214	Kentucky	64,125,476
Wisconsin	4,008,481	Nebraska	67,856,863
New York	6,129,445	Illinois	73,363,140
Mississippi	23,236,532	Missouri	96,993,000
Ohio	27,952,800	Kansas	158,976,828
Iowa	44,103,540		

That the reader may gather an idea of the exact force of these figures, the per cent of corn raised in the various States which was actually merchantable is given: —

Oregon	9⅓	Indiana	49
Wisconsin	17	Missouri	60
Michigan	18	Nebraska	67
Iowa	26	Kentucky	82
New York	35	Texas	91
Illinois	36	Mississippi	92
Dakota	38	Kansas	92
Ohio	38		

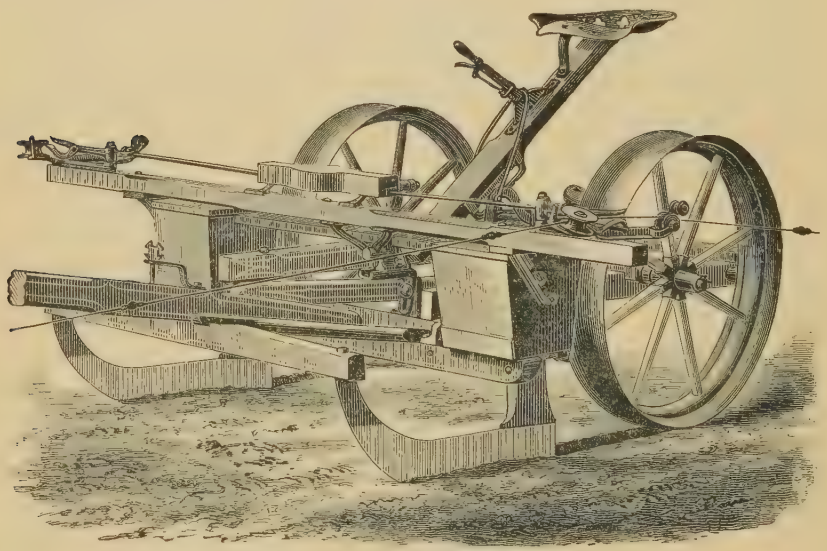
The United States Department of Agriculture shows, also, the number of bushels per acre raised in the best corn-growing States in 1883, and Kansas leads the van: —

Bushels per Acre.

South Carolina	8.0	New York	23.0
Georgia	8.7	Oregon	23.5
Mississippi	13.5	Kentucky	24.0
Arkansas	17.5	Colorado	25.0
Texas	17.5	Illinois	25.0
Dakota	18.2	Indiana	27.0
Tennessee	20.0	Missouri	27.5
Minnesota	20.8	Kansas	36.7
Wisconsin	21.0		

One who has examined the reports of the United States Department of Agriculture for the aggregate production of wheat in Kansas, says: —

"Kansas produced more corn to the acre than did any other State or Territory. Kansas produced sixty-two million more bushels of merchantable corn than did any other State or Territory. Kansas produced, in 1883, more corn than did any other State excepting Illinois, and at the present rate of increase will outrank Illinois in 1884. When one remembers these four facts, he cannot but acknowledge that Kansas is the first corn State in the Union. This, of itself, is sufficient to crown Kansas chief of the farming States, if no other crops were thought of.



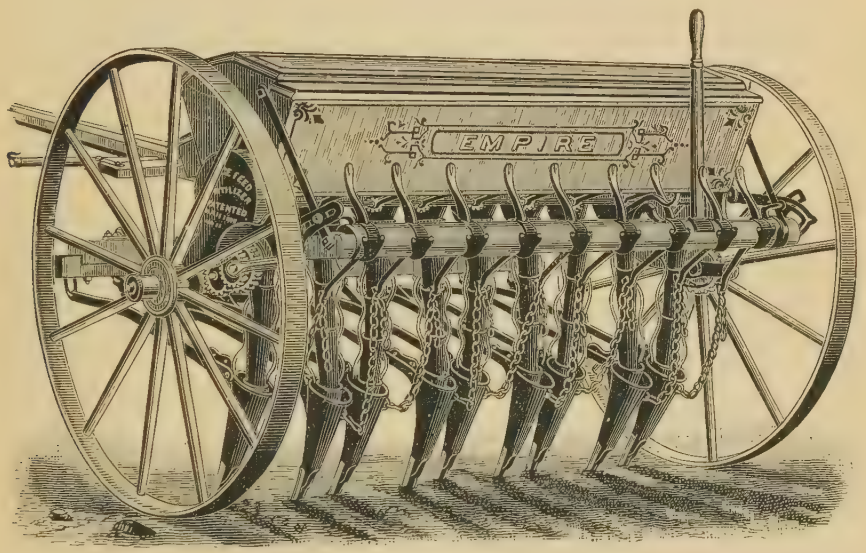
TWO-ROWED CORN-PLANTER.

"A careful examination of the official statistics as to wheat will prove that no State outranks Kansas in the profitable production of this cereal. In 1860 the aggregate yield for the whole State was 194,173 bushels. In 1870 it had increased to but 2,391,198 bushels. In 1882 the average yield per acre was 23.17 bushels, the total yield 35,734,846 bushels. In 1883 the yield fell to 26,851,100 bushels, Dakota producing 16,128,000, and Oregon 13,122,400 bushels. In 1883 only one State, Colorado, produced more wheat to the acre and got more money from each acre of wheat than did Kansas, and the limited area which Colorado can devote to wheat-raising takes her out of the list of rivals. For the product of each acre in

wheat Kansas farmers got sixty-five cents more than did those of California, $2.13 more than the dwellers in Dakota, and $3.25 more than the men of Minnesota. Herewith is given the number of bushels per acre raised in 1883 in various States. Colorado, which yielded twenty-one bushels to the acre, is omitted for reasons previously given.

Bushels of Wheat.

Kansas	17.5	New York	10.3
Dakota	16.0	Ohio	10.0
Nebraska	15.5	Illinois	10.0
California	13.0	Texas	8.5
Minnesota	13.0	Arkansas	6.1



EMPIRE GRAIN-DRILL.

The number of bushels of wheat raised in Kansas in various years from 1860 to 1883 was as follows:—

1860	194,173	1877	14,316,705
1870	2,391,198	1878	32,315,358
1872	3,062,941	1880	17,324,141
1873	5,994,044	1881	20,479,579
1874	9,881,383	1882	35,734,846
1875	13,209,403	1883	26,851,100
1876	14,620,225		

The yield of oats in Kansas is scarcely less remarkable than that of wheat The following comparative statement of the number of bushels of oats per acre in 1883 is derived from official sources:—

Arkansas	14.4	Iowa	34.1
Texas	22.8	Michigan	34.6
Missouri	28.7	Illinois	36.1
Colorado	29.3	Nebraska	40.0
Wisconsin	30.4	Dakota	42.9
Minnesota	33.1	Kansas	44.6

In 1884 Kansas sowed fifteen per cent more acreage of oats than in 1883. The State produced, also, 49,113,000 bushels of wheat, which was 13,000,000 more bushels than any State raised in 1883. Other statistics prove that farming in Kansas is diversified notwithstanding the prominence of corn and wheat. The rye crop of the State was:—

	No. Bushels.	Value.
1877	2,525,054	$806,092
1878	2,722,008	816,602
1883	5,084,391	1,666,909.70

Other Farm Products

Stands of bees in 1883	19,752
Pounds of honey	325,000
Pounds of cheese	591,770
Pounds of butter	23,947,016
Pounds of sugar made from sorghum	600,000
Gallons of syrup	4,684,023
Acres of sorghum in 1883	102,042
Value of sorghum cane per acre	$20.17
Total value of product of sorghum fields	$2,058,127.60

The per cent of returns on money invested in farming lands, officially stated, puts Kansas again at the head of the roll of honor. In Pennsylvania it is 13⅓ per cent; Ohio, 13⅜; New Jersey, 15½; Massachusetts, 16⅓; New York, 16⅝; Maryland, 17⅜; Indiana, 18 1/30; Michigan, 18¼; Illinois, 20⅙; Wisconsin, 20⅓; Virginia, 21⅛; Kentucky, 21⅛; Kansas, 22¼.

The value of Kansas farms is a very significant item. It is the value of only the 21,417,468 acres now in farms, and does not include the more than 30,000,000 acres not in farms. These farms are valued at only $10.98 per acre, while Massachusetts farms average $43.52; Connecticut, $49.34; New York, $44.41; Pennsylvania, $49.30; Ohio, $45.97; Michigan, $36.15; and Illinois farms $31.87 per acre. The following is the comparative value of farms in 1883:—

Dakota	$22,401,048	North Carolina	$135,793,602
Colorado	25,109,223	Texas	170,468,886
Oregon	56,908,575	Kansas	235,178,936
Arkansas	74,249,655	True valuation of all property in Kansas	$402,864,163.22
Nebraska	105,932,541		
Georgia	111,910,540		

We have quoted the value of the honey product of Kansas, which is but a fair illustration of the value of this industry all through the New West. It is a land of flowers, sweet-scented and beautiful. The bee finds it a natural home, and gathers sweets from its vast area of floral wealth. A tourist writes of the flowers of Kansas as follows: —

"Can you picture to yourself ten acres of portulaca? or whole hillsides curtained with what seems a superb variety of wisteria, except that it grows on a stalk instead of hanging from a vine? Do you know how it feels not to be able to step without crushing a flower, so that the little prairie dogs, sitting contentedly with their intimate friends the owls on the little heaps of earth thrown up around their holes, have every appearance of having planted their own front yards with the choicest floral varieties? Think of driving into a great field of sunflowers, the horses trampling down the tall stalks, that spring up again behind the carriage, so that one outside the field would never know that a carriage-load of people were anywhere in it; or, riding through a 'grove' of them, the blossoms towering out of reach as you sit on horseback, and a tall hedge of them grown up as a barrier between you and your companion! Not a daisy, or a buttercup, or a clover, or a dandelion, will you see all summer; but new flowers too exquisite for belief; the great white prickly poppies, and the sensitive rose, with its leaves delicate as a maiden-hair fern, and its blossom a countless mass of crimson stamens tipped with gold, and faintly fragrant. Even familiar flowers are unfamiliar in size, profusion, and color. What at home would be a daisy is here the size of a small sunflower, with petals of delicate rose-pink, varying from a cone-shaped centre of rich maroon shot with gold."

The same writer describes another scene as follows: —

"It was a river of flowers; I do not know how else to describe it. A deep hollow, like the dried channel of a river, perhaps nearly half a mile long, completely filled, between bank and bank, with a mass of most exquisite pink flowers. Not a green leaf nor a stalk could be seen, and there was not a break in the broad surface of bloom; though the flower itself, when examined, proved to be the tiniest of things;

something not unlike the little white sweet-clover that we find in eastern garden-beds; only of a most wonderful rose-color. The curious part of it was that not a single one of the flowers could be found anywhere in the meadow, even a foot beyond the river-bed; they were concentrated there, and only there, and lay like a broad pink ribbon on the prairie; a bit of landscape gardening which I have never seen a landscape gardener able to surpass.

SUNFLOWERS.

"If I were to chronicle the flowers as they appeared, I might date my prayers, as Miss —— did her diary, 'The day we found the first sensitive rose'; 'the day we drove over to the Elk House to see the prickly pear with sixty blossoms on it'; 'the day we saw the sunflower twenty feet high'; 'the day that I, a member of the Society for the Protection of Animals, which ought to include flowers, trampled down half an acre of crimson portulaca, because I couldn't find room for my horse's feet where there wasn't a blossom,' etc., etc. But I have grown fond of large figures since I have known the West, and am tempted to mass my flowers as nature does there, and give them all to you at once. Ah! If my page could only glow with their color! There were very few of the flowers we had known at the East; many were not even in the botanies."

Raising broom corn is a valuable industry of Kansas. Last year about thirty thousand acres were planted, which yielded twenty million pounds, valued at $700,000. The illustration shows the method of baling and shipping the crop.

Tree-planting is another prosperous industry, not only in Kansas, but in every State and Territory of the New West.

In 1881 there was in Kansas the following number of acres in planted forest:—

Walnut	5,895	Osage Orange	617
Maple	6,453	Catalpa	788
Honey Locust	1,215	Other varieties	38,763
Cottonwood	39,108	Total	92,839

BROOM CORN.

Since that time the acreage of tree-planting has rapidly increased. The governor of Kansas said, in his "Arbor Day" proclamation, that "the State which the pioneers found almost treeless and a desert, now bears upon its fertile bosom twenty million fruit trees and more than two hundred thousand acres of forest trees, all planted by our own people." A writer says:—

"These groves have attained a height of from fifteen to sixty feet, the trees having a diameter of three to fifteen inches. The annual growth is from one to two inches diameter, and a four or five year

old forest will thereafter furnish a good supply of fuel for the family. In the homestead counties, where the Government has stimulated artificial forestry by the 'Timber Act,' giving any man, or head of family, one hundred and sixty acres of land on the condition of his or her planting forty acres of the same in timber and caring for it seven years, beautiful groves of cottonwood, ash, box-elder, maple, and walnut dot the country in every direction, and lend a charm to the prairie landscape quite beyond the power of description. These charming groves will be as numerous and noteworthy, in the near future of Kansas, as the orchards of Michigan and Western New York. Columns of forest trees outline the farms and highways for miles and miles, in many districts, and it is no unusual thing for a farmer to plant ten thousand young trees in a single year. With the pretty valley timber belts and artificial groves grown into stateliness, ten years from to-day Kansas will be one grand continuous park, and the most beautiful country under the sun. Beyond the question of abundant and cheap fuel, building and fencing timber, and embellishment of landscape, which are involved in extended tree-planting, these groves will superinduce rainfall, temper the February and March winds, and give increased equability to the climate."

The State of Nebraska originated "Arbor Day"; thanks for the public enterprise of its citizens. Minnesota was the first State to copy Nebraska's example, and one million five hundred thousand trees were planted in that State on its first "Arbor Day." Now, the States and Territories west of the Missouri River make tree-planting an important industry.

Nebraska not only originated "Arbor Day," but enacted stringent laws, also, for the protection of trees, and made very liberal provisions to encourage tree-planting, as follows: —

"The Nebraska State constitution provides that 'the increased value of lands by reason of live fences, fruit and forest trees grown and cultivated thereon shall not be taken into consideration in the assessment thereof.' A State law 'exempts from taxation for five years $100 valuation for each acre of fruit trees planted, and $50 for each acre of forest trees'; also makes it obligatory that 'the corporate authorities of cities and villages in the State shall cause shade trees to be planted along the streets thereof.'

"Further: 'Any person who shall injure or destroy the shade tree or trees of another, or permit his or her animals to do the same, shall be liable to a fine of not less than $5, nor more than $50 for each tree injured or destroyed.'

"To encourage growing live fences the law permits planting 'precisely on the line of the road or highway, and for its protection to occupy, for a term of seven years, six feet of the road or highway.'"

Other States and Territories of the New West soon followed the good example of Nebraska.

From the Department of Agriculture at Washington we learn that "from 1854 up to and including the year 1882, covering a period of twenty-eight years, official statistics, with some reliable estimates to cover dates not thus provided, it is found there has been planted within the borders of what is now the State of Nebraska 244,356 acres of forest trees. This includes seedlings, seeds, and cuttings planted in permanent forests, groves, and along highways and streets in cities and villages. Spontaneous indigenous growth, since fires have been kept from borders of streams and ravines, is estimated equal to half the area planted."

"It is safe to say a majority of planting is made, originally, four feet by four, with view to cutting out first one-half, as growth demands space, and eventually another half of that remaining — three-fourths in all. Some plant six by six, others eight by eight. Planted four by four we have 2,622 trees to the acre, or a total of 640,701,432; eight by eight, 682 to the acre, or a total of 166,680,792. Average the totals, and there is shown 403,676,112. Add to the average the spontaneous estimate, one-half, and the grand total is, planted and grown in 28 years, 605,514,168 trees."

The National Government encourages tree-planting on its public domain, by what is known as "The Timber Act." The original passage of the act occurred in 1873, and was amended in 1874. In 1878 it was amended again, and put into its present shape. During the first ten years of its existence, 93,246 filings, covering 13,637,146 acres, were made — all but one million acres of the whole in the New West; a fact that proves the Far West to be largely in advance of the East in this important industry.

Most of the railroad companies of the New West have engaged in forestry, along their respective lines, and produced remarkable results. The Atchison, Topeka & Santa Fé Railroad Company employed a forester for several years; and the same was true of other railroad companies. The first object sought was to learn whether the soil and climate were favorable to the growth of trees; and what kind of trees were best adapted to different localities. Cottonwood, box-elder, black walnut, green ash, ailanthus, catalpa, elm, honey locust, gray willow, soft maple, and osage orange were the principal varieties

of trees planted. Their growth was marvellous. In eight years some of the cottonwoods were fifty feet high; honey locust, twenty-five; gray willows, forty; box-elder, black walnut, and maples, twenty.

A report of the Missouri River, Fort Scott & Gulf Railroad, October, 1882, says: —

"Three hundred and twenty acres are planted, and we are now planting 180 acres more. That will be finished before winter sets in, or before April 1, 1883. The plantation consists of catalpa (*speciosa*), with the exception of a few acres. They are all planted 4 by 4 feet apart, containing 2,720 trees to the acre. The land is prepared same as for corn, and the trees are planted with spades. The catalpa-trees planted in 1878, after four summers' growth, are 10 to 15 feet high and $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in diameter. Three years planted, 5 to 9 feet; two years planted, $3\frac{1}{2}$ to 6 feet (a drought last year); one year planted, 3 to 4 feet. On rich land these trees shade the ground after two years' cultivation. On poorer land they require three years' cultivation.

"On the Hunnewell plantation, three miles from Farlington, we have already planted 175 acres catalpa (*speciosa*) and ailanthus, and 60 acres of the white ash. The catalpa are one and two years planted; we will have 285 acres on the above plantation between now and April next, all catalpa and ailanthus, making 560 acres on the Hunnewell plantation. Our contract requires 2,000 trees to the acre when they are 4 to 6 feet high. Nearly every acre on both plantations will contain 2,500 trees; every acre will contain over 2,000 trees."

The St. Louis, Iron Mountain & Southern Railroad reported about the same time: —

"We have no trees planted on our road excepting 50,000 catalpa-trees on right of way near Charleston, Mo. We have a plantation or farm of catalpa-trees (100,000 trees) on Belmont branch, eighteen miles from Belmont, Mo. The above were all raised from seed. We also have a catalpa farm of 250,000 trees at Bertrand, Mo., about twenty miles from Bird's Point, on the Cairo branch of this road. These were planted in June, 1880, from slips. Have been cultivated twice, and are now in fine, thrifty condition. Will average about eight feet high, and will not require any cultivation after next year."

Mr. Crofutt said of the Union Pacific Railway, at that time, which planted immense numbers of the eucalyptus, or Australian blue gum-tree: —

"These trees are planted along the sides of the streets, around

public buildings, in the grounds of private residences, and by the Railroad Company in immense quantities. The latter had 300,000 of these trees growing beside their road and around their stations in the year 1877, and we understand 500,000 more are to be set out as soon as they can be procured. One peculiarity of this tree, besides its being an evergreen and unusually thrifty, is, that it will grow on the most sandy, alkaline, dry, and barren soil, and it is said to be a sure preventive against chills and fever, where it is grown in profusion. Some claim that it is fire-proof, and that shingles or plank sawed from these trees will not burn, and for that reason they are very much esteemed in Australia, — its native country, — and from

PIONEER FARMER'S HOME IN MONTANA.

which the first on this coast were imported. There are one hundred and twenty-five known species of the eucalypti, about fifty of which are found in California."

The foregoing facts are sufficient to introduce the reader to a charming industry which is comparatively unknown in the East. Here shade trees are chiefly planted for beauty and comfort; but in the New West both of these objects are secured together with large profits.

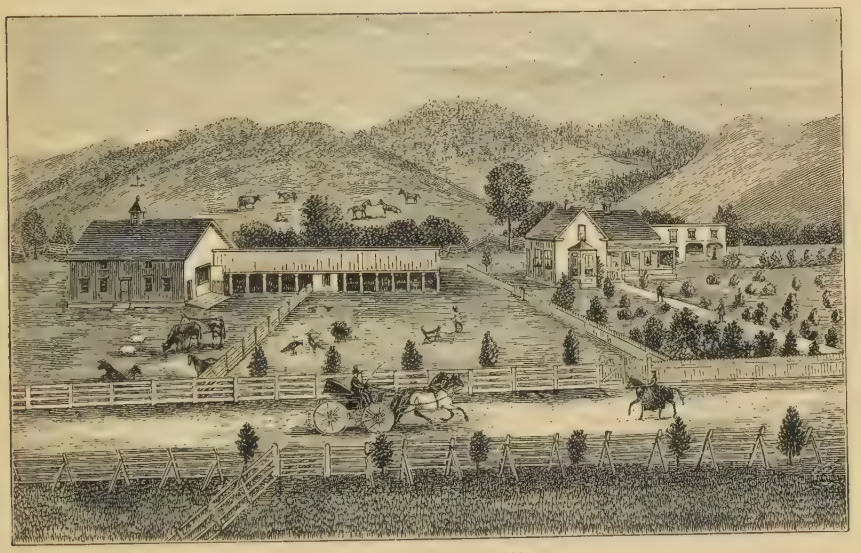
Eastern people wonder over the rush of farmers into Dakota, Montana, and other sparsely populated portions of the New West. The gold-fields of California never created more enthusiasm among enterprising men than have the wheat-lands of Dakota. A traveller who saw for himself, two years ago or more, said: —

"They are coming by excursions, in regular trains, sleepers, and stock cars; by carriages, white-covered wagons, on horseback, and on foot. They are coming by battalions and columns, by townships and counties, all flocking out here to settle Dakota. Every shade of business, every class of men and women, are represented. The lawyer has left his brief, the doctor his patients, the merchant locked his store, the banker closed his bank, the mechanic dropped his tools, the laborer quit his work, the farmer sold his possessions, the teacher resigned his position, and all rush pell-mell for Dakota to secure a quarter-section of her dirt — the sure foundation of a fortune. Some come for health, and all for wealth, but few are dissatisfied. Hundreds who emptied their pocket-books to obtain the fourteen dollars necessary to file upon their land three years ago are to-day worth from two to three thousand dollars, with good farms and happy homes."

The pioneer who was content and happy with his humble accommodations for a few years, as seen in the foregoing illustration, found ample reward for his labor and self-denial in his future independence and competency. An actual fact will confirm this statement.

A pioneer farmer from New Hampshire rented an eighty-acre farm in Montana, in 1870, on which there was a small log cabin and barn. Without capital, and with but one team, he raised two thousand four hundred bushels of wheat, which he sold for enough to enable him to purchase the farm, pay some old debts, and settle his family thereon, the next year. Another larger crop still replenished his purse, and sent him on his way rejoicing. Then he fought grasshoppers two years, and harvested fair crops notwithstanding their ravages. In 1875 he cleared something over four thousand dollars; and in 1877 he raised a large crop of barley, from which he realized five thousand dollars. The other crops raised that year were sufficient to pay hired help and incidental expenses, so that the barley crop was a net profit. The largest crop raised any single year was in 1881, when he threshed twelve thousand bushels. Ascertaining that his land was well adapted to raising barley for brewers' use, he devoted considerable of his fields to it, the last three crops amounting to from five to seven thousand dollars annually. His large crop raised last year would have exceeded any other had it not been for the low prices caused by competition inaugurated by the Northern Pacific Railroad. The wheat crop of his farm last year yielded something over twelve hundred sacks of flour. The only crop failure during the past thirteen years occurred in 1876, we believe, when his

five-hundred-acre field of growing grain was completely destroyed by a hail-storm, the loss of which was fully ten thousand dollars. The work of the storm was so complete that he did not raise enough for seed. Yet, with this failure and the disadvantage of starting with nothing and overburdened with several thousand dollars of debts contracted in mining operations, he has achieved a great success at farming. His herd of cattle has increased to over one hundred head, and they are of the best Shorthorn stock, and among which there are quite a number of first-class milch cows. His herd of mares, young colts, and yearlings numbers upwards of sixty head, and they, too, are good stock, for he will have no other. While speaking of



PLEASANT VIEW FARM.

some of his accumulations, it may be well to mention that he has a fine meadow and breeding farm bordering on the Missouri River, and a ferry on a direct road leading to Helena, a large steam saw-mill, shingle, lath, and planing mill, well located, the result of his farm.

The above is the farm as it now is — known as "Pleasant View Farm," Missouri Valley, Meagher Co., Mon.

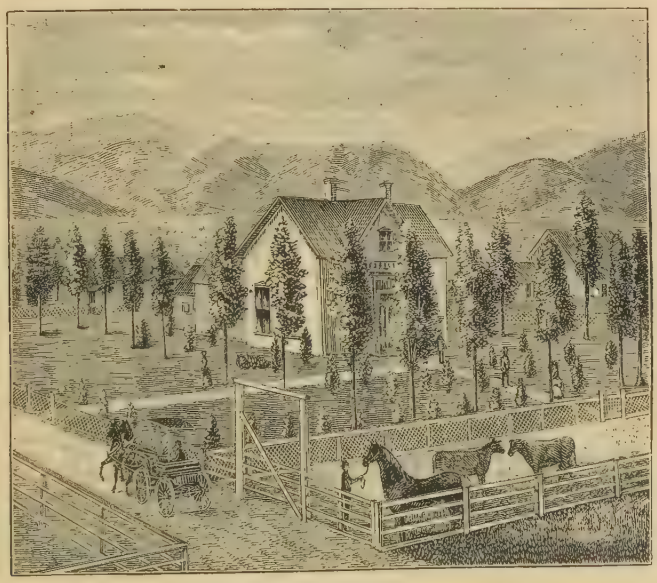
Another farmer, in Gallatin Co., Mon., began in a small way twenty years ago, gradually enlarging his farm as the sale of his crops enabled him to make purchases, until, at the end of ten years, his farm embraced six hundred and eighty acres, all of which he fenced and divided into mowing-fields and pastures. He put up seven miles of fence on his farm.

The result of his last ten years' operations is of special interest. In 1875 his crop, seventy acres of spring wheat, yielded three thousand bushels, and from ten acres of oats he threshed six hundred bushels. The grasshoppers in 1866 were so numerous that he did not put in any crop. He summer-fallowed his land, and devoted his time to building his dwelling and making other improvements. In 1877 he cultivated one hundred acres, raising three thousand eight hundred bushels of wheat and about six hundred bushels of oats. The grain was invaded by grasshoppers, which reduced the yield materially, yet the crop was profitable, as he sold the wheat at a dollar a bushel. In 1878 he bought and farmed more land. From sixty acres of sod-land he threshed sixteen hundred bushels of wheat, while the old land yielded about the same as formerly. The entire crop, except oats, which he used for feed, was marketed at one dollar per bushel. From one hundred acres of winter wheat raised in 1879 he threshed three thousand six hundred bushels, and his ten-acre oats crop yielded five hundred bushels. The markets were dull that year, and he was able to realize only about eighty cents a bushel for wheat. In 1880 his crop of one hundred acres of wheat yielded something over three thousand eight hundred bushels. His oats crop of a little less than twenty acres amounted to eighteen hundred bushels, which sold readily at one and a half cents per pound. The wheat crop, however, was damaged by frost, and was sold at from fifty cents to one dollar per bushel, the crop averaging about seventy-five cents per bushel. The year 1881 his farm of one hundred acres, sown and raised, yielded three thousand nine hundred bushels of wheat, and from ten acres of oats the yield was seven hundred bushels. He made flour of the wheat, and sold the same at three dollars per sack. The oats he sold at one and a half cents per pound. In 1882, from sixty acres of oats he threshed four thousand eight hundred bushels, and from fifty acres of wheat he threshed two thousand five hundred eighty bushels. The crop of 1883 was eighty-four and one-half acres of wheat, which yielded three thousand four hundred bushels, and twenty-four and one-half acres of oats threshed seventeen hundred bushels. The oats were marketed at a dollar and ten cents per hundred pounds, and the wheat made into flour is selling at the rate of from fifty to eighty-five cents per bushel, which was quite satisfactory to the proprietor.

In addition to farming, the proprietor of this farm, which is now known as the "Albino Park Farm," added stock-raising, in a limited way, to his enterprise; and now his farm, horses, and cattle are worth

thirty thousand dollars, though he would not sell out for that amount. The following cut gives a good view of the farm as it now is.

Although Montana has fourteen million acres of heavy forest, the Territory has sixteen million acres of land suitable for cultivation. In 1880 Montana stood at the head of the list, in number of bushels of wheat, rye, and oats raised per acre. A bulletin from the Agricultural Bureau at Washington showed that in the year 1880 the total number of acres sown in wheat in the Territory was seventeen thousand six hundred and sixty-five, and the total product was four hundred and sixty-nine thousand six hundred and eighty-eight



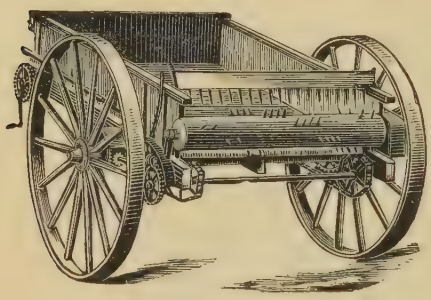
ALBINO PARK FARM.

bushels. This is something over an average of twenty-six and three-fourths bushels to the acre. The closest competitors are Washington Territory, which averaged twenty-three bushels to the acre, and Colorado, which produced twenty-two bushels. Utah only produced some sixteen bushels to the acre; California, fifteen bushels; Minnesota, between eleven and twelve bushels; and Ohio, the largest wheat-growing State in the Union, but eighteen bushels to the acre. Tests also made at Washington by the government authorities have demonstrated that Montana wheat produces stronger flour, and a larger quantity, than any produced by the best wheat-growing districts in the Union. To realize, too, the extent of Montana's wheat product per acre, it is only necessary to mention that the average per acre

throughout the United States is only a fraction over twelve bushels. The bulletin showed that in nearly all the cereal products Montana averaged a higher number of bushels per acre than the United States, as follows: —

	UNITED STATES. Average per Acre.	MONTANA. Average per Acre.
Wheat	12 bushels.	26¾ bushels.
Rye	10 "	28 "
Oats	25 "	37 "
Indian Corn	28 "	28 "
Buckwheat	13 "	12 "
Barley	22 "	30 "

The high northern altitude of Montana does not appear to be unfavorable to the rapid and thrifty growth of the cereals. Contrary to the ideas of Eastern people, who shiver when they think of dwelling so far north, the climate and rich soil appear to be adapted to each other, so that large reward for light labors is the farmer's experience.



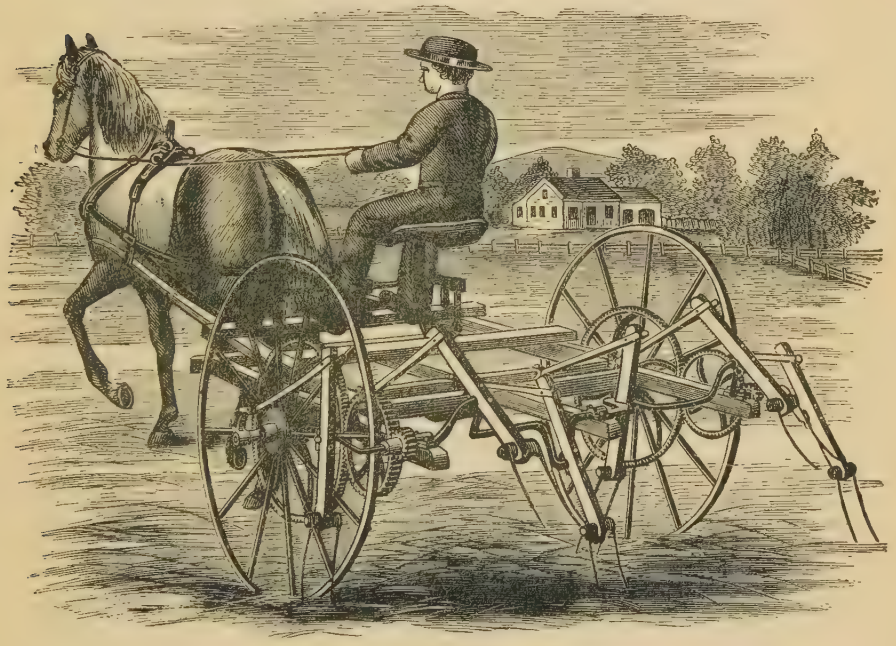
CART SPREADER.

Robert E. Strahorn, who speaks from observation, has so much valuable information to impart concerning Montana, that we quote him at some length: —

"An ex-surveyor-general of the Territory estimates that there is, in the more prominent valleys alone, room for thirty-six thousand first-class farms of one hundred and sixty acres each, while another is of opinion that there is a strictly agricultural domain here greater in extent than the entire area of Ohio. . . .

"Irrigation has generally been considered a necessity, although I know of localities in Montana in which from twenty-five to forty bushels of wheat to the acre were produced without it the past season. Thousands of acres of the richest and warmest soils — those found high up on bluff and mountain sides — were in 1877 sown with fall wheat, and the harvest last year of this grain, produced without irrigation, was so bountiful that many farmers who have hitherto raised spring wheat exclusively in the valleys, are now resorting to the hitherto despised highlands. Snow falls deeper on these altitudes than in the valleys, and keeps the grain well covered during much of the winter. However, the most conservative engineers and

others who are thoroughly familiar with the country, and whose opinion is entitled to credence, admit that three-fourths of the entire agricultural area, or twelve million acres, can be irrigated. The thirty thousand acres now in wheat [1881] produce an average of twenty-five bushels per acre. Improved cultivation would increase this average, as is shown by many farms whose average rarely falls below thirty bushels, and often reaches forty bushels, per acre. The man of figures can readily see that the production of one hundred million bushels of wheat per annum need not be postponed to a



HAY-TEDDER.

very distant future in Montana, if navigable waters reaching from her centre to the sea and the railways afford proper avenues to market.

"Ploughing for spring wheat commences in February, and the wheat is often sown during the same month. Montana wheat, by a recent comparative analysis at St. Louis, takes precedence of Minnesota spring or western winter grades. Oats are frequently raised weighing forty-four pounds to the measured bushel. Wheat can be raised at fifty cents per bushel, or $12.50 per acre, taking the low average of twenty-five bushels, and at ordinary prices will net at

about $14 per acre. Oats can be raised at an expense of $11 per acre, and yield a larger profit than wheat. Corn is not produced on a very large scale on account of cool nights in moist locations. It can be raised at a cost of $7.50, and will return about the same profit as wheat. Potatoes can be raised at a cost of $25 per acre, and will return a profit of from $75 to $90 per acre. . . . One man can attend to sixty acres of wheat, which will yield, in the best season, three thousand bushels, equal to twelve hundred bags of flour of one hundred pounds each, which may ordinarily be calculated to sell for three dollars per bag, yielding an aggregate of $3,600. The cost of seeds, sowing, irrigation, harvesting, threshing, and flouring will not exceed $14 per acre. The producer thus realizes a net income of $2,760, or about $46 per acre.

"Exceptional yields of grain and vegetables are chronicled which, to the farmer on artificially fertilized soils in the East, would seem simply impossible. At various Territorial fairs, held at Helena, samples of wheat yielding sixty to one hundred bushels per acre, of barley from seventy-five to one hundred bushels per acre, and of potatoes five hundred to six hundred and thirteen bushels per acre, have been exhibited, with sworn statements of parties who measured the ground and crops. The *average* yield of wheat is placed by residents at thirty bushels per acre, twice as large as that of the great wheat State of Minnesota, and nearly three times as large as that of Ohio."

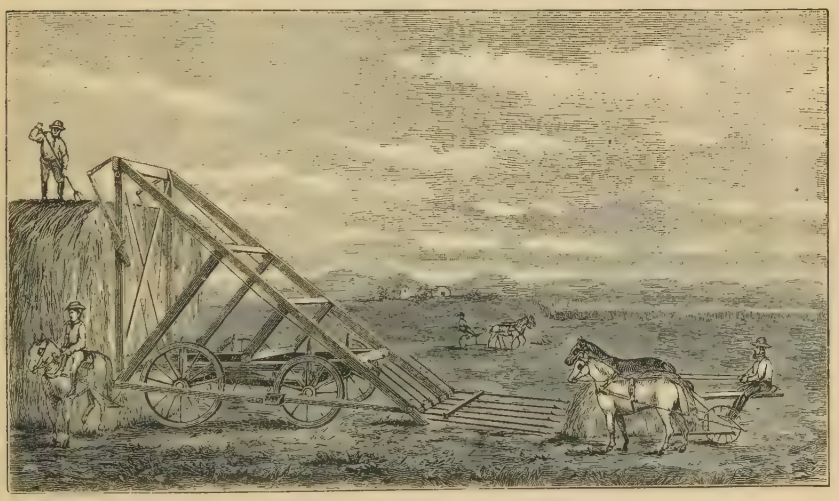
Mr. Strahorn continues: "Following are the names of several prominent farmers of different valleys, with size of fields, amount of grain threshed, the average yield per acre for one season, and the selling price of the crop:—

NAME.	LOCATION.	FIELD IN ACRES.	CROP AND YIELD IN BUSHELS.	AVERAGE PER ACRE. BUSHELS.	VALUE OF CROP.
A. G. England . .	Missoula Valley	160	Wheat, 7,000	43¾	$8,400
A. G. England . .	Missoula Valley	40	Oats, 2,000	50	1,200
Robert Vaughn . .	Sun River Valley	4	Oats, 410	102½	246
M. Stone	Buoy Valley	100	Wheat, 6,000	60	7,200
Brockway's Ranch	Yellowstone Valley	8	Oats, 600	75	360
Brigham Reed . .	Gallatin Valley	6	Oats, 620	103⅓	362
Marion Leverich .	Gallatin Valley	23	Wheat, 1,150	50	1,380
William Reed . . .	Prickly Pear Valley	50	Oats, 3,500	70	2,100
Charles Rowe . . .	Missouri Valley	23⅔	Wheat, Oats, 1,200	45	1,250
Con Kohrs	Deer Lodge Valley	11	Oats, 1,200	100	720
John Rowe	Gallatin Valley	85	Oats, 4,982	57	2,989
Robert Barnett . .	Reese Creek Valley	48	Wheat, 2,200	45⅝	2,640
S. Hall	Ruby Valley	400	Wheat, 10,000	50	11,000

Potatoes weighing from two to four pounds are frequently raised in Montana; turnips weighing thirty pounds each; and rutabagas from fifteen to twenty pounds.

Mr. Strahorn gives the quantity of vegetables raised by the soldiers of Fort Ellis, Gallatin County, in one season, as follows: —

COMPANY AND REGIMENT.	NO. OF ACRES.	POTATOES.	ONIONS.	TURNIPS.	CARROTS.	BEETS.	PARSNIPS.	CABBAGE.
		Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Head.
F, 2d Cavalry . . .	7½	1,100	90	500	60	50	10	3,610
G, " " . . .	5	550	60	60	35	15	20	2,500
H, " " . . .	6	1,200	130	35	40	40	25	3,300
L, " " . . .	5	700	50	150	25	..	..	2,300
G, 7th Infantry . .	3	315	6	40	12	..	20	800
Total	26½	3,865	336	785	172	105	75	12,500



AUTOMATIC STACKER AND GATHERER.

"General Brisbin states that the value of the several articles, if they had to be bought in Montana, would be about as follows: Potatoes, $3,865; onions, $2,352; turnips, $85; carrots, $206.40; beets, $315; parsnips, $225; salsify, $9.40; cabbage, $125; total, $7,182.80, from a twenty-six acre field. Rutabagas raised weighed as high as seventeen and one-half pounds each, without the tops. One potato weighed four pounds, and another three pounds four ounces."

In prosecuting agriculture on so large a scale as men do in the New West, human ingenuity has been taxed to the utmost to invent machinery equal to the occasion. The above illustration of the

"Drain Improved Automatic Hay Stacker and Gatherer" is one of the latest and best inventions. It not only lightens the labors of the farmer, and removes drudgery, but it greatly facilitates hay-harvesting on bonanza farms.

Those stockmen who are providing winter feed for their flocks and herds find this machine to be a real God-send to them. Without it they could not perform the task of putting up sufficient hay to feed the multitude of cattle on their ranges. But with it, they can now, at small expense, stack sufficient hay to assure good feeding for their immense herds in the severest winters. One man and three boys and five horses will put up as much hay, with this machine, as ten men and six horses could by the old method, and do the work better.

PIONEER HOME IN DAKOTA.

One stacker and two gatherers will stack from twenty to thirty acres per day; saving from fifty to seventy-five per cent of the expense by the old way. The hay, too, is worth from fifty cents to one dollar per ton more that is handled in this way.

The stacker puts up the hay in a much better manner than it can possibly be done by hand; the hay being thrown in the centre of the stack and not over the sides, as is done by hand, so that when the stack settles, it leaves the centre the highest. The hay is thrown on the stack straight, just as it comes from the mower, so that it sheds rain much better than when stacked by the old method. It is estimated that the price of a stacker and two gatherers is saved in putting up every seventy tons of hay with this machinery. And many

times its price is often saved in putting up hay from storms. It will stack hay in wind when it cannot be stacked with a fork. It is the only stacker that will handle hay in windy weather, on account of its peculiar construction. It is the only stacker that will not scatter the hay for the same reason. The pitcher-teeth are so made that they hold the hay from blowing away, and it is not released until the forward teeth pass over on the brace on the top of the stacker, when the hay is all released together and can fall on no place save on the stick.

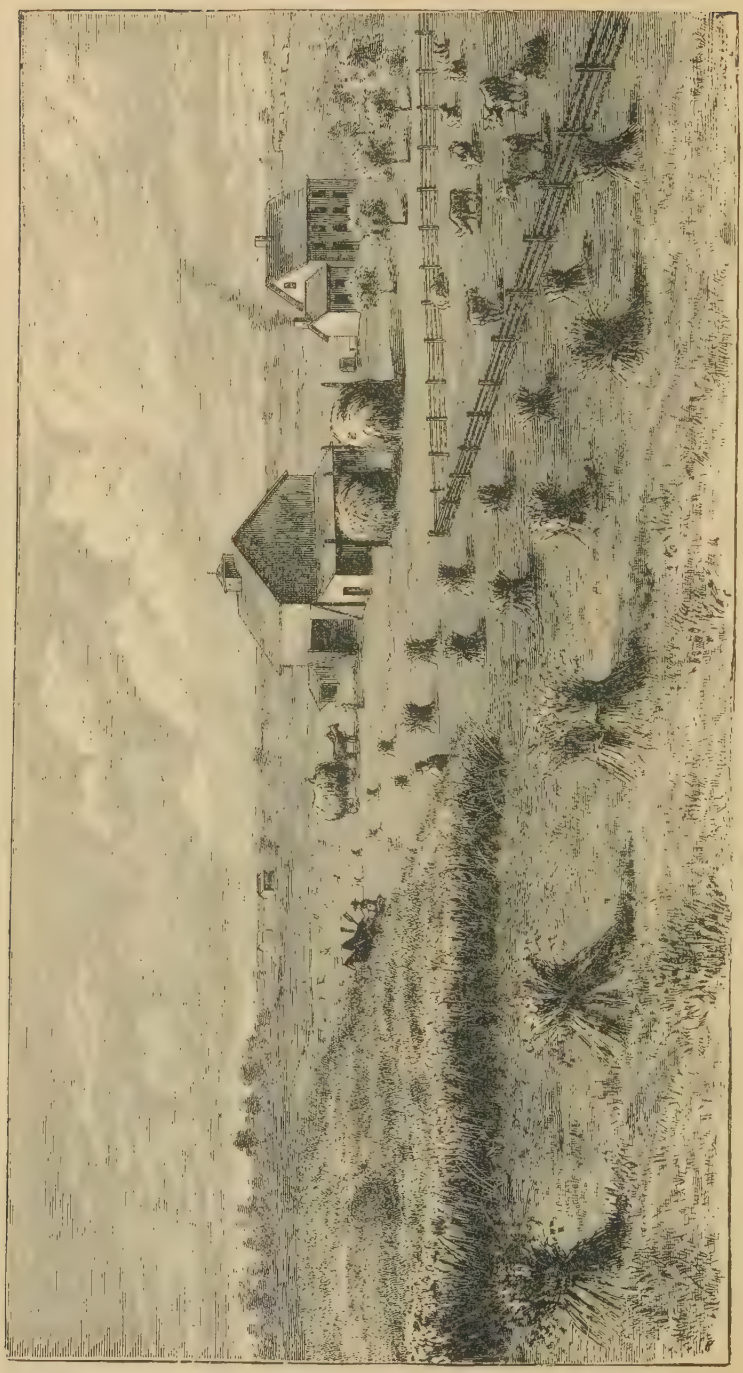
This is the only stacker that is arranged with adjustable pitcher-teeth, which is very desirable in topping off, and will enable a party to make a stack twenty-five feet high if desirable by pitching from the top of the stacker. Ordinarily it makes a stack about seventeen feet high without going to this trouble. It is the only mounted stacker in the market, and is operated and moved from place to place on an ordinary farm wagon.

Life in all the great agricultural regions of the New West is much alike. In the beginning there were hardships and self-denials of which the present knows nothing. The contrast between *then* and *now* is almost incredible; and it is due to agriculture that the Territory has taken such remarkable strides.

In the first place, Dakota is twice as large as all the New England States combined, more than three times the size of New York State, four times as large as Ohio, and nearly twice as large as England, Wales, and Scotland together. Twenty-four such States as Massachusetts can be set down upon its vast domain without crowding. If it were as densely populated as Great Britain, it would number over *fifty million* people; if as densely settled as Belgium, it would have a population of *seventy-two million.* Here is an empire in itself. And five years ago even, the scanty population of one hundred thirty-five thousand one hundred and eighty people produced twelve million bushels of wheat in one season. The following year the crop was almost double. Since that time a steady stream of settlers has poured into the Territory, and the wheat fields have multiplied by the thousand, until now the population are looking forward to no distant period when *two hundred million* bushels of wheat will be raised in one season. This vast territory has been divided into two States.

In 1885 Dakota's exhibit at the Exposition in New Orleans was the largest and most remarkable of all the Territorial departments. The arrangement was unique; and the preparation, on so grand a scale, denoted that Dakota farmers were confident of success.

Mr. S. S. Keeler, living about six miles south of Wessington, on



A DAKOTA WHEAT FARM.

section 2-110-66, has contracted all his crops of this season, the figures of which will show for themselves whether or not it pays to farm in Dakota. The following is a statement of his whole season's work : —

Breaking 94 acres, @ $3	$282.00
Backsetting same	141.00
47 bushels seed wheat, @ $1.25	58.75
Seed oats	53.75
6 pounds of onion seed	13.50
25 bushels seed potatoes	20.00
Labor of spring's work, including board, men and horses	180.00
Expense of harvest	154.00
Expense of threshing	192.64
Total	$1,095,64

Products.

900 bushels wheat, @ $1	$900.00
3,000 bushels oats, @ 30 cents	900.00
400 bushels onions, @ 75 cents	300.00
400 bushels potatoes, @ 40	160.00
Total	$2,260.00
Total expense	1,095.64
Balance	$1,164.34

Mr. Nichols had one hundred and fifty-six acres in crops as follows : wheat, forty ; oats, one hundred and ten ; barley, six. The expenses include his own time and that of his sons, so that the result is an absolute net. This statement does not include wear and tear of machinery, neither does it include breaking, haying, dairy and garden produce, or increase of stock : —

Expenditures.

29½ days, seeding, hand and team, @ $4	$117.00
50 bushels seed wheat, @ $1	50.00
15 bushels seed barley, @ 50 cents	7.50
235 bushels seed oats, @ 45 cents	105.75
16 days, hand and team, harvesting, @ $5	80.00
26½ days, shocking, @ $2	53.00
16½ days, hand and team, stacking, @ $5	82.50
16½ days, hand, stacking, @ $2	33.00
70 days' work, threshing, @ $2	140.00
8 days, team, threshing, @ $2	16.00
Threshing 217 bushels barley, @ 4 cents	8.68
Threshing 800 bushels wheat, @ 5 cents	40.00
Threshing 5,000 bushels oats, @ 3 cents	150.00
70 days' backsetting, @ $4	280.00
260 pounds twine, @ 20 cents	52.00
Expense of crop	$1,214.43

Receipts.

840 bushels wheat by weight, @ 44 cents	$369.60
225 bushels barley by weight, @ 50 cents	112.50
6,000 bushels oats by weight, @ 20 cents	1,200.00
Crop brought	$1,682.10
Total expense	1,214.43
Profit	$467.67

Who has not heard of the great "Dalrymple Farm" of Dakota? It contains seventy-five thousand acres, thirty thousand of which were in wheat last year. The original cost of the land was from forty cents to five dollars an acre. The farm has four great divisions, all of them under the supervision of Oliver Dalrymple. The four great divisions of the farm are subdivided into sections of five thousand acres with a superintendent for each. Then sections of five thousand acres are halved, giving subdivisions of two thousand five hundred acres.

Each division has buildings adapted to the wants of a great farm. There is a house for the superintendent, a stable, blacksmith's shop, granary, machine-house, and an ample boarding-house for employees. The division foreman and gang foreman are mounted, and each one superintends twenty teams.

There are twenty steam-threshers on the farm and over one hundred self-binding reapers. The horses and mules required amount to several hundred; and there are so many men that they can be profitably managed only by military rules. Hence, army rules are here applied to agriculture; and the most complete order and systematic labor prevails under General Dalrymple. Each season is a campaign well-planned and fought to conquer the earth. Mr. Henry Van Dyke, Jr., speaks as follows, in *Harper's Magazine*, of his ride over the farm:—

"A little way off we saw a long line of teams pushing slowly across the boundless plain. They were ploughing. It was a very different sight from that ploughing which we have seen in the steep fields of New England, where Johnny steers the old horse carefully along the hillsides, and the old man guides the plough as best he can through the stony ground; different, also, from that ploughing which Rosa Bonheur has painted so wonderfully in her picture at the Luxembourg, in which the French peasant drives his four-in-hand of mighty oxen, butting their way through the misty morning air. Here on this Western farm there were twelve sulky ploughs, each drawn by four mules, moving steadily along a two-mile furrow. The

shining blades cut smoothly into the sod, and left a rich black wake of virgin earth behind them. As we looked out over the great plain, and slowly took in the extent, the fertility, the ease of cultivation, we echoed the local brag: 'This is a big country, and don't you forget it!'

"'Yes,' said Gad, 'that is the trouble: it's too big. I can't get it on canvas. A man might as well try to paint a dead calm in mid-ocean.'

"We spent an evening in the comfortable home of one of the superintendents, and heard him explain the system of book-keeping. Every man is engaged by contract, for a certain time, to do certain work, for certain wages. He receives his money on presenting to the cashier a time check certifying the amount and nature of his labor. The average price paid to hands is eighteen dollars a month and board. In harvest they get two dollars and twenty-five cents a day. A record is kept by the foreman of the amount of wheat turned out by each thresher, by the driver of each wagon of the amount of wheat loaded by him, and by the receiver at the elevator of the amount of wheat brought in by each team. All the farm machinery and the provisions are bought at first hands for wholesale prices. Mules and horses are bought in St. Louis. Wheat is not stacked or stored, but shipped to market as rapidly as possible. Everything is regulated by an exact system, and this is what makes the farms a success.

"Brains and energy in the man who controls them and in those whom he chooses as his subordinate officers — this is the secret of the enormous profits which have been made on the Dalrymple farms. The cost of raising the first crop is about eleven dollars an acre; each subsequent crop costs eight dollars. The average yield for this year was about nineteen bushels to the acre. This could be sold at Fargo on Oct. 1 for eighty cents a bushel. A brief calculation will give you four dollars and twenty cents per acre profit on the new land, and seven dollars and twenty cents for all the rest; or, say, one hundred thirty thousand dollars gain on one crop. These figures I believe to be too small, rather than too large."

The *Moorhead News* said, last season: "Just east and south of the city may be seen a continuous field of wheat containing sixteen thousand acres, which promises to yield not less than twenty bushels per acre. Three hundred and twenty thousand bushels of No. 1 hard from a single field is not bad."

J. W. Barnum, Esq., a prominent farmer in Sanborn, Dak., spent

the winter of 1885 in his old home in Brooklyn, N.Y., where he defended his adopted Territory by the following amusing and instructive letter to the *Eagle* : —

"You will remember the writer as an old resident of the Twenty-third Ward during the winter. In the summer he is a North-Dakota farmer. Last February you gave an extended report of his lecture at our Academy of Music, on bonanza farming in Dakota; stock-raising in Montana, Oregon, and Washington Territory; the attractions to tourists in the Bad Lands, National Yellowstone Park, Columbia River, and Puget Sound, — in aid of a 'little Congregational church on the hill' in Dakota, named after our Brooklyn Central, Rev. Dr. Behrends. Before we left for Dakota, in July, we subscribed for the Daily *Eagle*, to be sent to Sanborn, Barnes County, Dak. For three months you have been 'touching us on the quick' by mailing your paper, printed label, to Sanborn, 'Barren' County, instead of Barnes. We said to ourself quietly, 'We will get even with the *Eagle*, on our return home this fall, by bringing samples from this "Barren County."' We hand you herewith samples of our No. 1 hard wheat, and your common Long Island Swedish yellow turnip, which grows here, in your favored garden patch for Brooklyn and New York, about the size of your double fist. This sample, as large as we could well bring in our trunk, weighs twelve pounds; there were some which weighed thirty-nine pounds. They are solid, crisp, and sweet. Beets twenty-three pounds. Cabbages twenty-five pounds. How is that for 'Barren' County? Our wheat, your millers will tell you, is superior to any grown south of that latitude; indeed, we claim a practical monopoly in raising this variety of 'hard' wheat, as it cannot be raised in perfection south of that cold latitude; when taken south it deteriorates. It is used largely in mixing with your soft wheat to grade up your flour. Not only wheat and all the cereals, but vegetables and all root crops, 'reach perfection there, near the northernmost limit of their production.' This is a surprise to nearly all Eastern and Southern people. The peculiarity of our 'hard' spring wheat (rightly named, for you should get your teeth insured before you bite it) is its being almost solid gluten; when cut into it looks like a piece of solid glue; the soft wheats, when cut, on the inside are floury or starchy; the glutinous properties are what the millers want to make the best, strong bread-making flour. In the recent long report of the Bureau of Chemistry of the United States Department of Agriculture, reference is made to two thousand seven hundred specimens of wheat analyzed, as well as

the flour made from them, and the bread baked from the flour. The chemist's comment on this analysis is as follows: 'The Eastern flour is poorer in nitrogen and gluten than any of the others. In fact, the flours follow closely the composition of the wheat, which has been examined from the same parts of the country. Dakota makes a flour richer than any other in gluten, in the same way that it produces a wheat of that description. The average of these Northwestern spring wheat flours is high, and, in comparison with the rest of the country, they are the richest which have been analyzed.'

"When you go to the World's Fair in New Orleans, Alexander McKenzie, the commissioner for Dakota, will show you a pumpkin measuring eight feet long, six feet in circumference, and weighing one hundred and sixty-eight pounds; and a squash weighing one hundred and fifty pounds; sweet and Irish potatoes, — three weighed thirty-one pounds; one hundred and one pounds of honey taken from one stand of bees, — still 'it is so cold the bee cannot live there.' This fair will teach you poor Easterners, who express so much sympathy for us ('forty degrees below zero'), that we can raise something besides blizzards and cyclones in North Dakota. Those who take an interest in agricultural development may be sure the Dakota exhibit alone will well repay for the trip to New Orleans. We saw the Burleigh County exhibit at Bismarck, the capital of the Territory, before the long train started on its triumphal march to the Gulf. We predict they will repeat their triumph at Minneapolis, over the Northwest in 1882 and 1883, carrying off the 'silk banner for the best county exhibit.' You will have noted Governor Pierce's latest estimate puts the population now at nearly five hundred thousand. If you were not so strongly Democratic, we would whisper in your ear, will it pay you Democrats, in the long run, to keep us out of statehood because we are so largely Republican. Dakota must be prominently in the eye of the people, seeking to better their condition, as witness how she leads all the States and Territories in the amount of Government land sold — six million acres in each of the last two years, enough to make three States of the size of Massachusetts. No section of our country is so rapidly developing in population, churches, and schools. There are two thousand school-houses; thirty million bushels is her wheat product this year. Dakota has demonstrated within the last two years that its grasses are fully as nutritious and much more abundant than those of Montana, and stock and sheep raising in the near future will equal in value its wheat and other cereals. Ninety-two thousand head of young cattle

have been brought in, and eighty thousand head of fat beef cattle taken out, on one line of railroad during the last year. One writer says: —

"'It is a misfortune for Dakota that her commissioner cannot transport to New Orleans a quarter-section of the best land, to show the soil; and also take down to that Southern clime some real Dakota atmosphere, and let them see what a genuine Dakota day is. The bracing air here is one of the subjects which call for enthusiasm. Mr. McKenzie says that the Territory has been slandered regarding its cold weather, for he has lived here all his life, and never saw a day so cold that he could not be out most of the time.'"

Idaho was comparatively unknown until recently. The completion of the Oregon Short Line and Utah & Northern Divisions of the Union Pacific Railway across the Territory opened it to the world. Its name signifies "Gem of the Mountain," which appears, at first, like a misnomer to the traveller. But from *twelve* to *fifteen million* of its *fifty-five million* acres are rich and promising; and, under the magic power of irrigation, will prove second to no part of the New West in productiveness. Already a tide of immigration is flowing into it from every quarter of the globe; and wealthy syndicates are bringing hundreds of thousands of acres under the transforming power of irrigation. The record of one of these timely and useful organizations is before us, — "The Idaho Land and Water Company," which has opened three hundred thousand acres of the richest land in the beautiful Snake River Valley, by irrigating canals north of Ogden, U.T. To those readers who are shivering at the thought of dwelling so far north, let me say that the climate of Idaho resembles that of California, where all the cereals and fruits grow thrifty. In the Snake River Valley "The International Immigrant Union" is locating a colony under the most favorable auspices. The company locate settlers on eighty, one hundred and sixty, three hundred and twenty or six hundred forty acre farms, the settler obtaining the same from the Government at $1.25 per acre under the "Desert Land Act," paying for the same twenty-five cents per acre upon filing his or her application, and the balance, $1 per acre, at the end of three years, or before, if water is brought upon the land in sufficient quantity to irrigate the same. The company controls the waters of the Snake River Water Company, having a carrying capacity of one hundred thousand inches of water, which can be increased as the demand increases. In order to enable the settler to file the necessary affidavit to procure his patent to the land, the company

sells to each settler one or more shares in the Canal Company at $10 a share, thereby making him interested in the irrigation scheme, and giving him a contract for all the water required to irrigate his land at $1 per acre per annum. The company also makes special arrangements to convey settlers from New York, Chicago, and Omaha to Eagle Rock, the headquarters in Idaho, — four days from New York, three days from Chicago, and two days from Omaha.

It is of great advantage to pioneers to find such arrangement for their reception in Idaho or any other part of the New West. Settling upon land already under irrigation enables the farmer to commence work at once without experiment or unnecessary delay.

The following paragraph from the letter of a tourist will enlighten the reader still further upon the climate of that northern latitude: —

"I was surprised to find on my trip on the 19th of December from Eagle Rock through the Snake River Valley not a particle of snow; but found farmers busy at work, some ploughing, and others building and preparing for spring crops. The weather was very similar to that of Northern California, and I feel sure that anything that can be grown in California, except semi-tropical fruits, can be grown in Eastern Idaho."

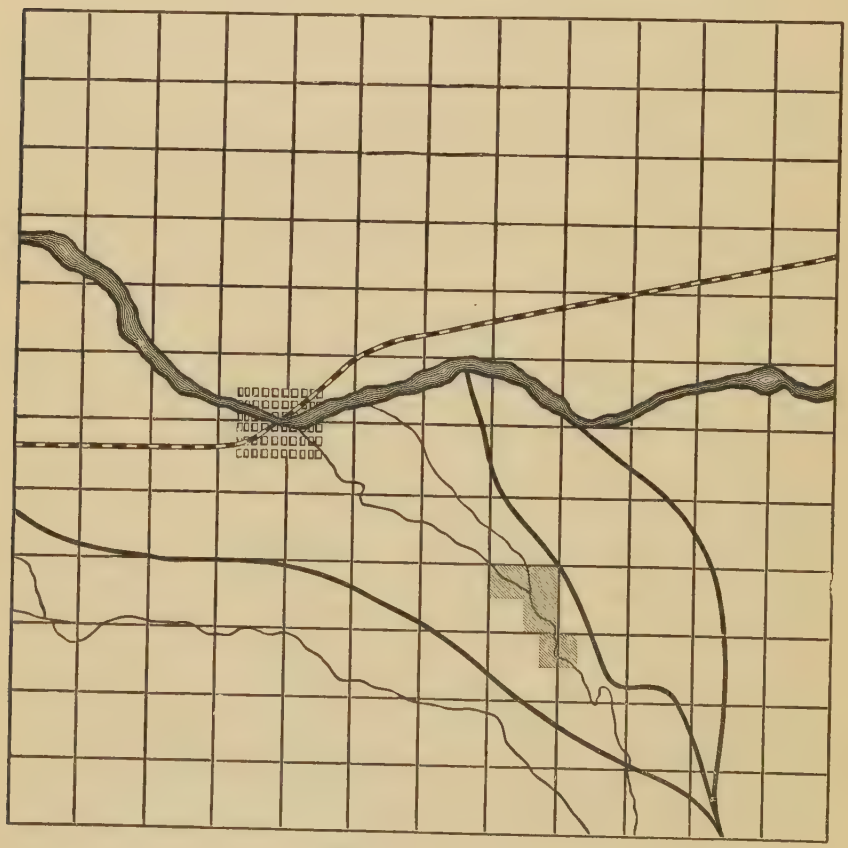
The diagram on next page, showing the location of the Snake River Water Company's canals and lands of the International Immigrant Union capable of irrigation, is furnished that the reader may see how Eastern capital and enterprise open the most distant agricultural lands of our national domain to settlement.

From Mr. Straham's official report we add more facts: —

"The fourth year's growth of apples in Boisé Valley has yielded two hundred pounds; of cherries, seventy-five pounds; of peaches, one hundred and fifty-two pounds; of pears, one hundred and thirty pounds; of plums, one hundred and fifty pounds; while small fruits, such as strawberries, currants, gooseberries, blackberries, and raspberries, are very profilic. The growth of wood made by fruit-trees, and the quantity of fruit often found loading the branches, is almost incredible. John Lamb, in Boisé City, has black locust-trees on which I was shown limbs which had grown from twelve to fifteen feet in one season; and plum, peach, and apple trees, two years from the graft, full of fruit. In the yard of Governor Neil, at Boisé, I counted one hundred and forty nearly ripe greengage plums on a branch seventeen inches long, the plums averaging one and one-half inches in diameter.

"There is a grand future in store for the Idaho fruit-grower.

Montana to the north, Wyoming on the east, Nevada to the south, produce practically no fruit. With her railroads soon reaching the remotest corners of these Territories, and with a vast consumption at home, Idaho is assured the best fruit markets in the land. Fruit can be produced in all her lower valleys, and short-sighted is the settler who does not take advantage of the above facts."



IRRIGATION IN IDAHO.

"The cereals do almost as well in Idaho as the fruits. Oats yield fifty-five bushels per acre; wheat, thirty bushels; rye, twenty-five bushels; potatoes, two hundred and fifty bushels. The truth is, Idaho is one of the best grain-producing regions in the United States, and in proof of this statement I submit the following official table of the yield per acre: —

	WHEAT.	RYE.	OATS.	BARLEY.	POTATOES.	CORN.
Idaho	30	25	55	40	250	35
Nevada	12	..	31	..	95	30
California	17	15	30	23	114	34
Oregon	21	14	31	23	95	33
Eastern States	13	15	31	23	69	26

"In one case fifty-four pounds of wheat were produced from a single square rod, being at the rate of one hundred and forty bushels to the acre. The wheat produced in this instance has been called 'Idaho white wheat,' and is thought to be superior. It matures from fall to spring sowing; is white, beardless, and heavy, and produces a large proportion of flour.

"Mr. I. N. Costan, a member of the legislature for many years, and one of the most prominent farmers in the Boisé Valley, made the following statements to me while I wrote them down: —

"'Last year, 1882, on ten acres of poorest land, with imperfect irrigation, raised forty tons of red-clover hay. Sold seventy-five thousand pounds (twelve hundred and fifty bushels) of onions from two acres. Potatoes only gave two hundred bushels to the acre. Have raised one thousand bushels on two acres. Have raised one hundred and thirteen bushels of barley on an acre. Wheat from forty to sixty bushels; oats one hundred to one hundred and fifty bushels; carrots and turnips equally good with potatoes. Connecticut flint-corn will grow well, especially on the higher benches; have raised sixty bushels to the acre in the bottoms. Prunes, the Germans say, grow better than in their own country. Apples, pears, peaches, plums, apricots, cherries, etc., as good, if not better, than in the most favored spots in California. The elm, soft maple, black-walnut, locust, etc., make our best shade trees.'

"Immediately south of Boisé City, Mr. Thomas Davis has an orchard of some ten thousand apple-trees, which have produced this season an immense quantity of the choicest fruit ever grown in any country in the world. The orchard is about twenty years old, and in excellent condition, except that the superabundance of the yield this year broke down the limbs of some of the younger trees. Since the apples began to ripen, men with carts have been constantly engaged in gathering the fruit carefully and assorting it for the market.

"Preparatory to shipment the apples are packed in fifty-pound

boxes. They readily find a market in all parts of Idaho and adjoining States and Territories. No less than two hundred and fifty thousand pounds of this fruit have already been sent by rail to various parts of the Northwest, and Mr. Davis still has as many stored away in a three-story building, specially prepared for the purpose, on his premises, and shipments continue to be made almost daily. Apples boxed and shipped net about $1.25 per hundred pounds, so we may safely calculate that the fruit already disposed of and that yet in store will bring Mr. Davis a clear $6,250. Besides this, he has one hundred and fifty barrels of vinegar, twenty thousand pounds of choice dried apples, and a considerable quantity of pears and cider. Altogether this year the net profit derived from this sample orchard will reach a handsome $10,000. This is only a sample of what Idaho is doing in the way of producing fruit which is everywhere pronounced of superior quality and delicious flavor."

The most marvellous things of agriculture, however, belong to California, whose "Golden Gate" admits us to even better treasures than vaults of gold and silver. Between the two mountain ranges — Sierra Nevada and the Coast Range — lies a rich, fertile valley, which was once an inland sea. It is forty miles wide, and contains five million acres of splendid land. This Sacramento Valley has an average annual rainfall from eighteen to twenty inches, and therefore yields fair crops, even without irrigation.

The San Joaquin Valley, which begins at Stockton, is not less fertile than the Sacramento, and contains seven million acres. Add to this the foot-hills on each side, and adjacent mountain valleys, and here are nearly twenty million acres of the best land in the world for cultivation.

While the average rainfall is sufficient to assure good crops, irrigation has been extensively introduced so as very largely to increase production. California is properly called "Cornucopia of the world." Grains and fruits of every sort grow luxuriantly, even tropical fruits, and harvest-time is a season of wonderful revelations. California is a flower-garden, too, where the size and beauty of floral specimens defy description.

The year in California is divided into two seasons, the wet and dry. The wet season commences about the middle of October and continues until April or May. This is the season for seeding, really from September to May, so that the farmer has ample time to put in all the seed he desires to plant. It is claimed that one man, with a

two-horse team, can put in from two to three hundred acres during seeding-time.

Haying often commences at the close of the wet season, and continues, together with harvesting, until September, without a storm or shower. No arrangement could possibly be made so convenient for California farmers. They produce three times as much to a man as do the farmers in any other State of the Union, because of the aforesaid arrangement of the seasons. They can labor the year round, if they wish, a season for idleness being unnecessary.

Wheat, barley, and oats are threshed on the field, put up in bags, and left there for weeks, without any danger of being wet or of

CALIFORNIA FARM HOUSE.

sweating in that dry atmosphere. The farmer may not possess a building for storing his grain, because it is unnecessary in a climate where grain can be left safely in the field. Hay is stacked in the field, and left there until it is wanted. Potatoes are not injured by being left in the ground long after they are fit to be gathered.

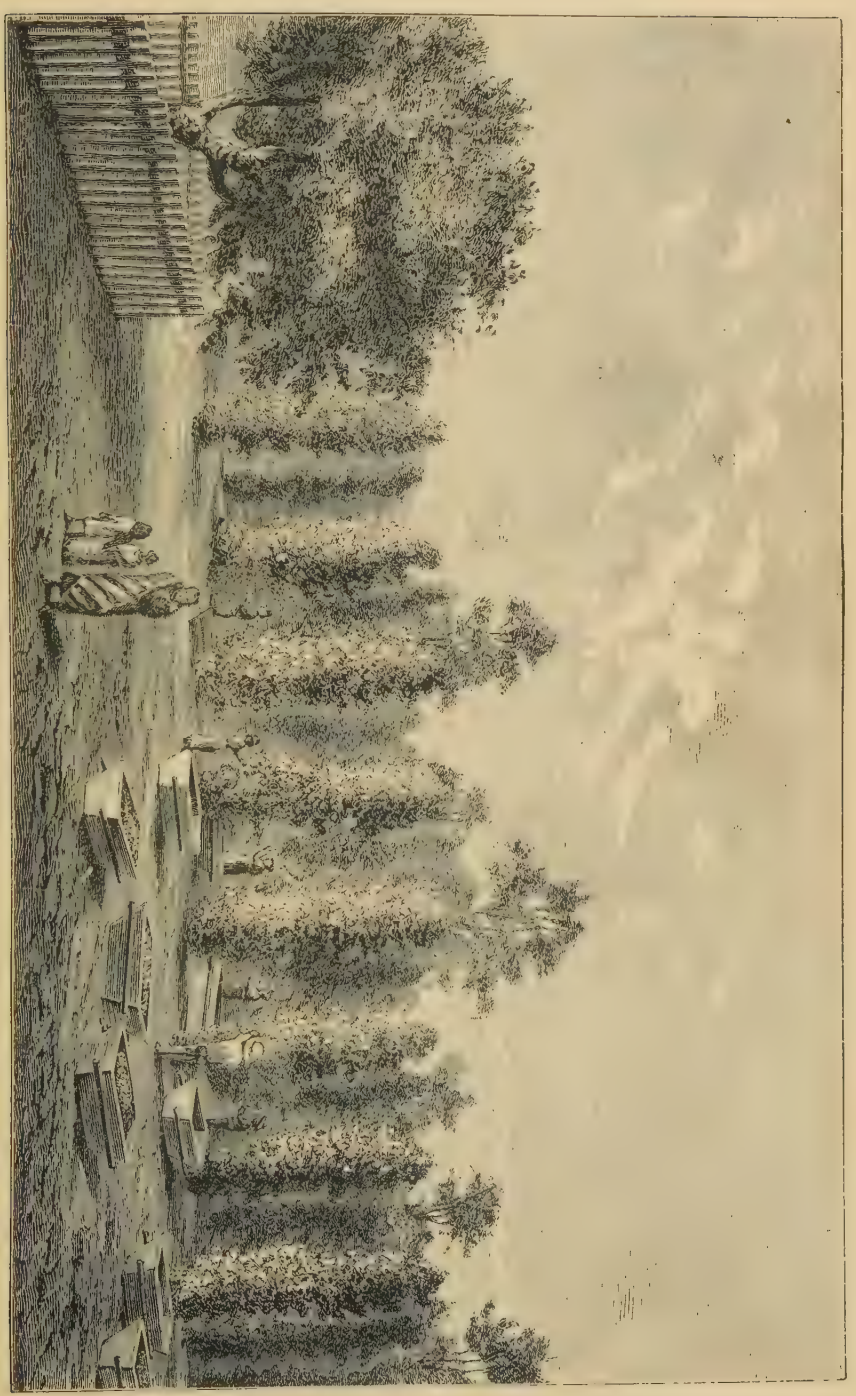
Fruit trees thrive much better in California than in New England. Apple-trees begin to bear at three years of age, and the peach at two. The plum and cherry tree grow larger, bear much earlier, and their fruit is less perishable than kindred fruits in the East. A farmer's orchard will have apple, peach, pear, cherry, prune, quince, plum, nectarine, pomegranate, fig — not to mention other fruits — growing

with a luxuriance such as is not known in New England. Figs yield two crops in a year. With care, strawberries can be produced in every month of the year. The orange, lemon, lime, almond, olive, English walnut, and apricot flourish finely in Southern California. The best raisins in the world come from this locality.

The growth of fruit and other trees is remarkable. The apricot often grows to the size of a forest tree. The eucalyptus, a fine evergreen of the New West, has been known to make twenty feet in one year. A traveller claims that he saw one eight years old, that was seventy-five feet high, and two feet in diameter at the base. In the southern part of the State farmers build fences by sticking into the ground sticks of willow, sycamore, or cotton-wood, eight feet long. In two years the farmer has a substantial fence, and cuts therefrom all the firewood his family require.

Mr. Nordhoff says: "Where nature has done and does so much, man gains a quick reward for his efforts. Our costliest and rarest greenhouse flowers grow here out of doors all winter, almost without care. In the vineyards are planted by the acre the grapes which at home are found only in the hot-houses of the wealthy. The soil is so fertile that it is a common saying in the great valleys that the ground is better after it has yielded two crops than at the first ploughing; and though, as a rule, the farmers in Southern California often live in small and mean houses — the climate which permits children to play out of doors without overcoats or shawls for at least three hundred and thirty days in the year, and which makes the piazza or the neighboring shade-tree pleasanter than a room, in winter as well as summer — this is because one does not much need a house. The dwelling is a less important part of the farm than with us. The climate even in the northern counties does not oblige you to have a costly or substantial building; and while the farmer may and does work in the soil in every month of the year, and has thus an enormous advantage over his Eastern friend, on the other hand I do not exaggerate when I say that what a farmer in Iowa, Minnesota, or Kansas must pay out in two years for fuel to keep him and his family comfortable in winter, and for the shelter of his cattle from cold, would pay his way to California, and, if he chose well, almost buy him a farm."

Mr. Nordhoff adds some interesting facts. "Near Marysville, a farmer, finding that his orchard of apples, pears, etc., did not pay as well as formerly, bethought him of the castor-bean. He planted several acres as an experimental crop, found that his soil was suitable



HOP FARM.

for it, and I saw on his place one hundred acres in castor-oil. The plant, which is with us in the East a tender, ornamental shrub, was planted and hoed or ploughed like corn, and, when ripe, a press in a shed at the edge of the field made the oil. In the East his adventure would have needed a solid brick building for his machinery, as well as costly drying and bleaching rooms. Here the oil was bleached under a rainless sky, and a shed which could not have cost fifty dollars, sufficiently protected his engine and press."

"In the Napa valley a farmer thought hops would pay. He planted ten acres, and two crops gave him a handsome little fortune. Some years ago farmers within reach of the San Francisco market planted cherries; and I know a man whose cherry orchard, wherein Chinese pick the fruit at a trifling expense, has netted him for several years past thirty dollars a tree."

The following table shows the number of acres in hops, in several counties of California, and the increase of 1883: —

	Old Yards.	New Yards.
Sacramento and Yolo	764	1,062
Sutter	..	57
Lake	130	195
Mendocino	721	926
Santa Cruz	22	92
Napa	66	25
Alameda	70	35

In other districts of California the increase has been about the same.

A newspaper in Mendocino County, Aug. 31 of the same year, the picking season, said: —

"Rev. S. L. Sanford finished picking his hops last Wednesday morning, and the ten acres yielded forty-six thousand pounds of green hops, or an average of one thousand five hundred pounds to the acre. T. J. Fine has been running a force of twenty to twenty-five pickers in his old field of seven acres, for two weeks, and thinks it will take a week or ten days to finish up that one field. The yield is simply enormous, and will not be less than two thousand pounds dried to the acre. Besides this, he has about eighteen acres of new hops to pick. In Redwood Valley everybody is busily engaged, and the families have gone right into the fields and camped, and in one field there are as many as one hundred pickers. . . . Estimating the yield of the one thousand six hundred and forty-seven acres of new and old fields at one thousand pounds to the acre, Mendocino will

place upwards of one and a half million pounds on the market this season, but what the net proceeds will be to the producer cannot be predicted as yet with any degree of assurance.

The exports by rail and sea during the years 1883, 1884, and 1885 were as follows: —

	1883.	1884.	1885.
	Pounds.	Pounds.	Pounds.
From San Francisco by sea . . .	160,167	183,613	419,982
From San Francisco by rail . . .	2,707,290	1,721,040	2,458,100
From the interior by rail	1,914,740	1,286,520	3,300,350
Grand Totals	4,782,197	3,191,173	6,178,432

In other parts of the New West, hop-culture is a very profitable industry, especially in Oregon and Washington Territory. The acreage of hops along Puget Sound in 1882 was one thousand acres, producing one million six hundred thousand pounds. In 1883 the acreage was doubled — two thousand acres, producing two million four hundred thousand. The average price at which the hops were sold was fifty cents per pound. The highest price was ninety cents per pound, and the lowest twenty-seven cents. During the last two or three years the price of hops has fallen considerably.

There is a hop farm in Washington Territory containing *three hundred acres.*

Ten years ago California did little at raisin-making, except to dry a few raisin-grapes, and sell them for "dried grapes." But now raisin-making is one of the largest and most profitable industries of California; and these raisins are classed with the best raisins in the New York and Boston markets.

Good land for raisin-culture can be bought in Los Angeles and San Bernardino Counties for forty and fifty dollars per acre, though it is claimed that at a hundred and twenty-five dollars an acre the industry is very profitable. One of the leading raisin-makers of the State claims that a vineyard of the raisin-grape, irrigated and under careful cultivation, will yield enough grapes the third year to pay all the expense of running that year; and on the fourth year will yield a crop that will pay the whole cost of land, planting, and culture up to that time, even where the land has cost one hundred dollars an acre. He claims that raisins may be raised so as to pay one dollar per vine, or five hundred and fifty dollars per acre.

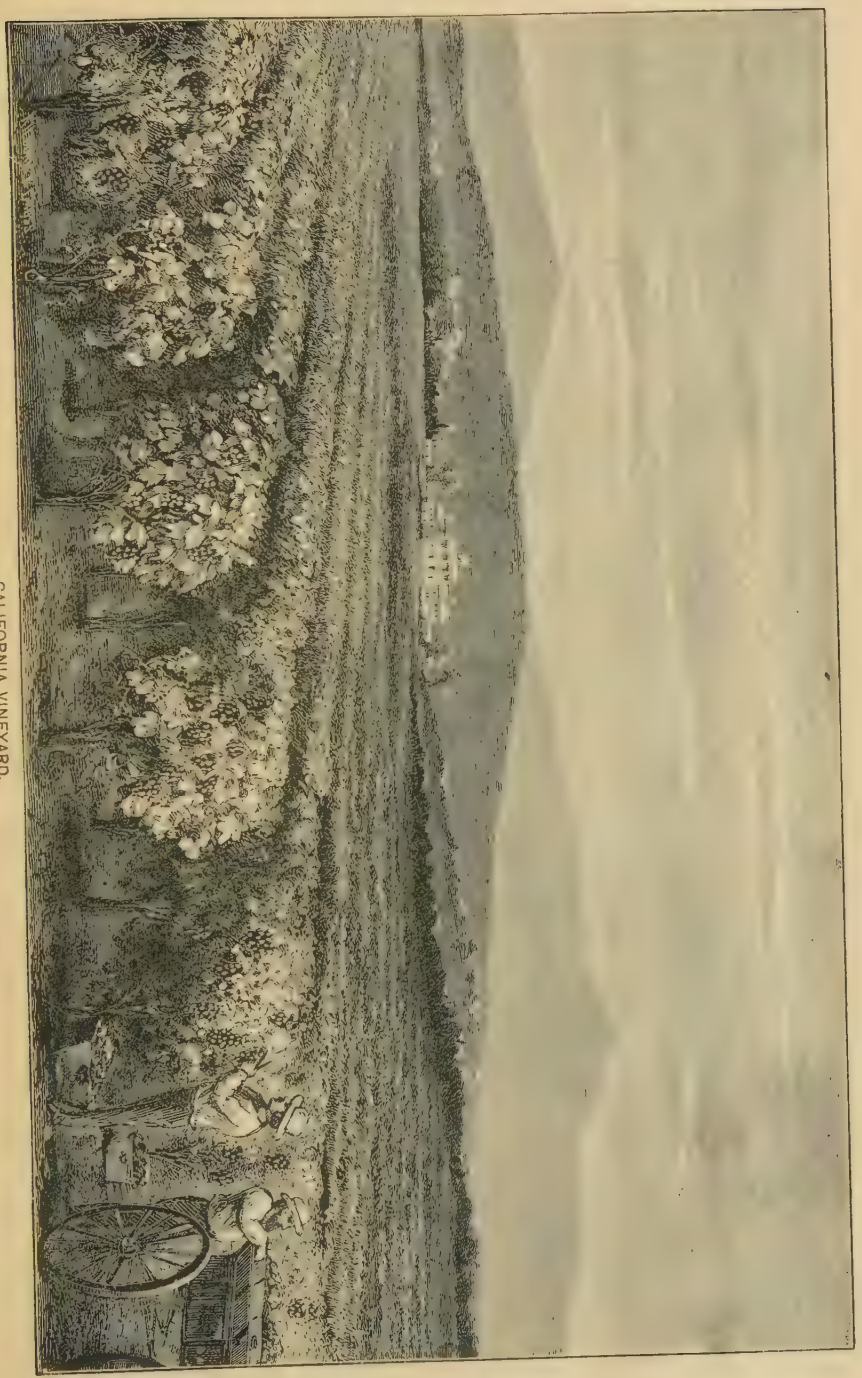
A raisin-dealer of Boston wrote to a California raisin-maker as follows : —

"I received your raisins last week, and must say they are far ahead of what I expected to receive. I have only seen one quality of raisins that surpasses them, and they are what we call the finest Dehesia, packed by Campuzana Brothers. Allow me to make one suggestion, and that is, in packing your raisins, especially the finest that you have, have the papers made of more colors and better finish ; by so doing you will get a better price, and it will also give the public an idea that it is the finest fruit packed. One other thing I noticed, and that was, the skins are apt to be a little tough, but not one person in a thousand would notice it, and in fact, but few dealers. The color is all O K, as far as New England trade is concerned. As to the size of the raisins, they are larger than ninety per cent of the imported fruit that comes to this country. I have handled raisins for the past ten years, from the cheapest to the finest imported, and know what I am talking about. A salesman here that has sold goods for the oldest wholesale house in Boston, says these raisins are the finest California raisins he ever saw. If you can improve on them in any way, I don't see but you have a big thing before you, for it is only a matter of time when the California fruit will drive the foreign out of the market, and the best brands will always be in demand, and of course bring higher prices."

The Boston *Commercial Bulletin* says : —

"California raisins are made from the Malaga grape, and are large and of excellent quality, and are acknowledged to be superior to the foreign. They are also fresher, as they never have the leathery taste given to the foreign raisins by the sea voyage. Vast quantities of land are being annually, especially in Southern California, devoted to the culture of grapes for raisins, and the growers are constantly increasing and improving their facilities for drying and packing. They are also introducing a number of Spanish laborers, and will thus derive all possible advantages from skilled labor. The grapes can be grown so cheaply in California, and the raisin production is increasing so rapidly, that, in a few years, possibly in 1885, it is confidently expected that the California raisins can be laid down in this market at $1.25 to $1.30 for a twenty-four-pound box, at which price the foreign raisins cannot compete with them."

Wine-making, however, is the leading industry of California, and grapes are raised for this purpose. The business has increased remarkably within a few years, as manufacturers have become famil-



CALIFORNIA VINEYARD.

iar with the improved methods of manufacture. They have wine-presses now that will crush from eight to ten tons of grapes in an hour; and wine-casks that will hold three thousand gallons are common, while there are some which hold from ten to fourteen thousand. Fifteen years ago California made less than two million gallons of wine. In three years from that time the quantity was doubled. Now the annual yield is ten million gallons, and rapidly increasing. Yet the business is in its infancy. It is claimed that if ten thousand acres should be planted in vineyards annually, it would require a century for the State to possess as many vines as have been destroyed by phylloxera in France within ten years.

"Vineyards planted but two and a half years are shown which already produce five tons of grapes to the acre. Five years is the period required to bring the vines into full bearing. It is estimated that an acre of vines arrived at this condition will have cost one hundred and twenty-five dollars, allowing fifty dollars as the price of the ground. But it is then counted upon for an annual yield of ten tons of grapes, and these find a ready sale at twenty dollars a ton. The rate of growth in vegetation is one of the important things to note. Fruit trees are said to advance as far in three years in this earthly paradise as in seven at the Eastern seaboard."

The production of honey in the New West has become enormous. It is in very truth "a flowery land," where bees may revel nearly every month of the year in fields of floral wealth unsurpassed. The cut on the following page presents a scene on a bee farm in California, showing the arrangement of hives, and the general appearance of the country in which bees specially thrive.

Some of the farms, or ranches, of California are of immense proportions. Mr. Nordhoff gives some idea of these large possessions by saying: —

"It is a favorite story, that certain men are able to drive a herd of cattle from the northern counties of the State to San Diego, at its extreme southern limit, and quarter the animals every night upon their own territory. Haggin, Carr, and Tevis, whose property I was privileged to examine considerably in detail, have some *four hundred thousand acres*. Much of this was secured for a mere trifle while in the condition of waste land, and afterwards redeemed. A neighbor who had acquired a great estate of a similar kind, mainly while holding the post of surveyor-general of the United States, drew forth one of the best *bon mots* of President Lincoln. 'Let me congratulate you,' said Lincoln, as this gentleman was retiring from office under

his administration. 'You have become monarch of about all you have surveyed.'

"The owners do not often live upon their estates, but leave them in the hands of managers, and draw the revenues. The Haggin, Carr, and Tevis property is divided into a number of separate ranches, each

BEE CULTURE.

with its resident superintendent. The Bellevue Ranch, so called, is the centre and focus of authority for the whole. Here is the residence and office of the general manager, and here are assembled a force of book-keepers, engineers, and mechanics, who keep the accounts, map, plan, supervise, construct, and repair, and give to the whole the clock-work regularity of a great commercial enterprise.

The numerous buildings constitute a considerable settlement. There is a 'store' of general merchandise and supplies. A dormitory and a dining-hall have been erected for the laboring hands. A tower-like water-tank, surmounted by a windmill, and accommodating a milk-room below, rises at one side. There are shops for the mechanics, capacious barns, and long sheds filled with an interminable array of agricultural implements. It is worth while to take a walk past this collection of reapers, threshers, sulky ploughs, and rakes, and study out their uses. The immense 'header and separator' rises from the rest like some awe-inspiring leviathan of the deep. A whole department is devoted to the 'road scrapers,' 'buck scrapers,' and ploughs of various sorts used in the construction and dredging out of the irrigating ditches. The soil is fortunately free from stones, and the work is for the most part quite easy. One enormous plough is seen which was designed to be drawn by sixty yoke of oxen, and to cut at once a furrow five feet wide by four deep. Like the famous steamship *Great Eastern*, it has defeated itself by pure bulk, and is not now in use.

"More than five hundred thousand dollars has been expended on the great estate in the item of fencing alone. An average of four hundred laborers is employed, and in the harvest season seven hundred. The rate of wages is quoted at from two and a half to three dollars per day to mechanics, and one dollar per day to common hands. This seems low as compared with information from other sources, and that which appears in the chronic complaints of the scarcity of farm labor in the California papers."

Of the orange culture, Mr. Nordhoff says: "The seedling orange-tree bears, at twelve years from the planting, an average of one thousand marketable oranges, and I know of a tree at Riverside which bore at thirteen years two thousand two hundred and fifty oranges, which brought the owner seventy-four dollars. The following year (1880) it bore two thousand fifty. The orange is prone to overbear, and this tree had evidently done too much, for in 1881 it had less than half this number of oranges on it.

"They plant from eighty to one hundred trees per acre; and it is easy to see that the profits of a bearing orchard, even at the lowest prices, are very great. Eighty trees, bearing one thousand oranges each, sold at ten dollars per thousand, would yield a gross return of eight hundred dollars. Now, one man can cultivate, irrigate, prune, and care for twenty acres of any of the citrus fruits, and the picking and boxing cost no more than about one dollar and fifty cents per thousand.

But at fifteen years old, seedling trees bear two thousand oranges each, and the average price is now (1883), and will for many years remain, over twenty dollars per thousand. One of the shrewdest orchardists at Riverside said to me, 'At half a cent apiece, the orange crop would still remain the most profitable a man can grow'; and he was right. Half a cent each would be five dollars per thousand; which for mature trees would still give a gross return of ten dollars to the tree, or from eight hundred dollars to one thousand dollars per acre, according to the number of trees planted per acre in different localities.

CALIFORNIA ORANGE GROVE.

"Such returns seem incredible, even to one on the ground; and I needed, to enable me to realize the practical results, some such statement as was made to me by one of the most careful and intelligent orange cultivators I met, — the owner of twenty acres in a choice location. 'Last year my trees paid the whole of my family expenses for the year; that was my first crop. This year I shall make over five thousand dollars; after next year I am planning to take my family for six months to Europe, and I expect thereafter to have four or five months for travel every year, with sufficient means from my twenty acres to go where my wife and children may wish to go.'"

Alfalfa is Chilian clover introduced into California some twenty

years ago, and is now grown profitably in nearly all parts of the New West. In California from three to six crops of it are gathered in a year, and from one and a half tons to two and a half per acre each time it is mowed — the grand total per acre for the year being somewhat incredible. In Colorado and other parts of the New West, two and three crops annually are raised, often two tons to the acre at each cutting.

Alfalfa is a very nutritious grass, excellent for horses that are not hard-worked, for milch cows, and even for pigs and fowls. In nearly every part of California it keeps green throughout the year. But it requires much water, so that irrigation is indispensable. Its roots strike deep, much deeper than the clover of New England, making an occasional soaking absolutely necessary. Under proper treatment, it becomes one of the most remarkable agricultural products.

Alfalfa appears to grow as thriftily in Idaho as in California, very much to the surprise of farmers. A Mr. Payne, near Boisé City, raised three hundred and sixty tons of alfalfa on sixty acres of land (six tons per acre), and one hundred and sixty tons of clover on forty acres (four tons per acre).

Our limited space will allow no further discussion of agriculture in California except the addition of miscellaneous facts.

"An immense land bequest was recently made by a San Franciscan. The late James Irvine left to his only son, among other property, one hundred and eighty thousand acres of land in one body in Los Angeles County. This large domain Mr. Irvine bought jointly with another man in 1857, paying at the rate of thirty-seven and one-half cents per acre. In 1875 Mr. Irvine bought out his partner for two hundred and fifty thousand dollars. He has since been offered one million dollars cash for the property. There is a valley of twenty thousand acres in the tract, worth one hundred dollars an acre, or two million dollars for the valley. Some small farms have been carved from this portion and sold at this figure. On the tract is a coal mine, which is yielding an unfailing supply of coal of good quality for locomotive purposes, and is under lease to representatives of the Southern Pacific Company. There are between thirty thousand and forty thousand sheep and several thousand cattle upon this land. The actual cash value of the whole tract is, at a fair estimate, about four million dollars."

"The *Los Angeles Herald*, speaking of crop prospects in Southern California, says the demand for the single article of cabbages is simply enormous. Carload after carload of the popular vegetable is being

shipped to the Territories and to Texas, and bring a return of at least five hundred dollars an acre to those who raise them. All the prospects for a large fruit crop are fine for the present summer. About seventeen million grape-vines will this year yield their luscious fruit, while the peach, apple, pear, and apricot crop will be about double that of former years."

In 1886 an olive orchard of fifty acres yielded fifty thousand bottles of oil that were sold for one dollar a bottle — FIFTY THOUSAND dollars income from the fifty acres, one thousand dollars per acre!

"O. Lockwood, of Compton, has an apple orchard of one thousand trees, which has yielded him one thousand dollars' worth of fruit this year. Of this, two hundred trees are eight years old, being of different varieties, and eight hundred trees of the white winter pearmains, three years old. Of the older trees Mr. Lockwood has sixty which have paid him an average of seven dollars each this year. This orchard is set out in sandy soil, depth to water being only five feet, and the trees have had no irrigation for years. This shows conclusively that apple culture in South California is a paying industry."

"Tulare is now making its boasts about a big pumpkin-vine, and if the story be true, has the floor against all comers thus far. This particular vine attained immense proportions, and a crop of eighteen pumpkins was gathered from it, weighing from thirty-five to ninety pounds, a total weight of one thousand one hundred pounds being removed from the single vine."

"The largest raisin vineyard in the world is owned and operated by G. G. Briggs, of Yolo County, containing over one thousand acres of the choicest varieties of raisin-grapes. The vines are from two to seven years old, and when they come into full bearing, will yield the owner a small fortune every year."

"It is estimated that one hundred and forty thousand acres of land in California are planted in vineyard, and that two thousand nine hundred and twenty-six persons are engaged in the grape industry exclusively. Of these, Los Angeles has the largest number, four hundred and fourteen persons, while Sonoma has two hundred and eighty-eight; Fresno, two hundred and sixty-four; and San Bernardino, two hundred and thirty-seven. The land, with improvements, is estimated to be worth sixty million dollars, and supports one hundred and fifty thousand people."

Compared with Kansas and other localities, Colorado is not distinguished for its agriculture. Yet it is rapidly advancing in this line, and in due time will make a grand report. Even now the State

ranks high in respect to quality of farm productions and number of bushels of wheat and potatoes per acre. An average of twenty bushels of wheat and two hundred of potatoes per acre is a good showing for the Centennial State, especially when it is known that thirty bushels of wheat and five hundred of potatoes are sometimes grown upon an acre.

Colorado contains five million acres of agricultural lands, located mostly in the valleys of its great rivers. This is but a fraction of its immense domain of sixty-six million eight hundred and eighty thousand acres, it is true; but then, this small fraction of territory is about the size of Massachusetts. It contains quite a number of beautiful parks in the mountains, with deep, rich soil that rewards irrigation and industry with a wealth of products. Four of these parks are marvellous creations of nature in size, fertility, and beauty. North Park contains nine hundred and sixty thousand acres, situated nine thousand feet above the sea-level; enough land to accommodate six thousand farmers with one hundred and sixty acres each. And these farmers will find it to be exhilarating business to till the soil up nine thousand feet towards the sky. Middle Park contains one million one hundred and fifty-two thousand acres, about eighty-five hundred feet above the sea, — a little lower down, to be sure, but sufficiently high to insure bracing air and good digestion. This park would give to each of seventy-two hundred farmers one hundred and sixty acres. South Park contains one million four hundred and eight thousand acres, higher up even than North Park, for it is ninety-five hundred feet above the sea. Here eighty-eight hundred farmers might find ample room on one hundred and sixty acres each. But larger than all the three parks named is the San Luis Park, that spreads out far and wide from the base of the marvellous Mount Blanca, and contains five million one hundred and twenty thousand acres, situated seventy-five hundred feet above the sea. Here is enough land to cut up into thirty-two thousand farms of one hundred and sixty acres each. The State of Massachusetts could be set down within this mammoth park, and leave room for a respectable driveway around it.

The proprietor of a farm in San Luis Park writes: —

"Wheat I have threshed forty bushels per acre; an average crop will be about twenty-five or thirty bushels. On good land oats will grow six to seven feet high, and seldom lodge as they do in a wet climate, the straw growing hard and strong, enabling them to bear up the fine, large heads of grain. I have measured some of them

twenty-two inches in length, and counted several with two hundred and fifty grains to the head. One of my neighbors this season had a large field of nearly fifty acres that threshed sixty-eight bushels per acre, the land being manured to obtain this result. An average crop of oats will be about thirty-five bushels. Barley will thresh as high as fifty bushels, an average crop about thirty bushels. Peas I have threshed forty bushels per acre; the same land would not yield over twenty-five of oats. That is the great point in favor of peas, as they will grow on the very poorest land, and they rather tend to enrich instead of to impoverish the land, and one pound of peas is equal to one pound of corn to raise pork, or fed to almost any animal; therefore I say that this valley could raise sufficient pork to supply the State, and the day is coming when we shall cure and pack that staple article.

"Some of my potatoes yielded twenty thousand pounds of marketable potatoes this season per acre. Cabbage, forty thousand pounds per acre, an average crop being about twenty-five thousand pounds. An average crop of potatoes is about twelve thousand pounds. I weighed a cauliflower the past season, and found its weight to be fifteen pounds, without a leaf. Beets, carrots, parsnips, and onions do remarkably well."

Another farmer in the same park writes: —

"The first year broke three acres of land; planted one acre in oats and two in potatoes; latter turned off ten thousand pounds per acre, and sold for four cents per pound; total income first year, eight hundred dollars. Second year, used same ground and cut eight tons of wild hay; income about the same. Third year, cut one hundred tons wild hay, which sold for fourteen dollars per ton, and later in season brought twenty-two dollars and a half. Have now been on my farm for eleven years; have a good house, barn, and fences, the property being worth thirty thousand dollars, on which valuation it pays ten per cent per annum."

Before railroads reached Colorado, many articles of food were scarce, and fabulous prices were realized. A single farm cleared seventeen thousand dollars for its owner from a crop of potatoes. A farmer near Denver planted between two and three hundred acres of potatoes, which yielded him fifty thousand bushels, and he sold them for fifty thousand dollars. His yield per acre was much smaller than that of several Colorado farmers the same year, who raised from five hundred to eight hundred bushels per acre, though this was an exceptional yield.

The report of the "Denver Chamber of Commerce and Board of Trade" for 1885 report average crops as follows: —

Wheat, per acre	25 bushels.	Corn, per acre	35 bushels.
Oats, "	45 "	Potatoes, "	200 "
Barley, "	40 "	Onions, "	250 "

The same report says, also: —

"There are vineyards in the vicinity of Boulder that have for two years past produced twelve tons of grapes per acre each season, of marketable, luscious fruit, comprising such varieties as the Concord, Delaware, Salem, Martha, Brighton, and Catawba, while at Cañon City and near there, in the Arkansas Valley, thousands of vines are producing every year from six to ten tons per acre without fertilizers, and not having to be buried in winter. With winter protection, the choice European and California grapes can be produced abundantly and profitably, such as Black Hamburg, Sweetwater Chasseles, Tokay, Missouri, Seedless, Sultana, and Muscats. . . . One orchard near Florence has produced eight thousand bushels of apples of fine quality in one year. . . . Colorado apples are especially fine as regards flavor and keeping qualities, and are of good marketable size, all of which was demonstrated at the New Orleans Exhibition of 1885 and 1886, when over one hundred varieties were there shown, and captured four out of the twelve first premiums awarded. After almost every sample from other States had decayed, and even those from Germany and Russia, ours were in good condition."

Other facts, showing the agricultural marvels of this locality, will appear in the sequel, as we pass to the consideration of the subject of Irrigation. A few miscellaneous items of interest, however, may be added at this point.

Eastern people suppose that Arizona is a barren and desolate region, when actual experiments have proved that much of the soil is unsurpassed in richness and fertility. In the southern part of the Territory the farmer grows two crops a year. Thousands of acres have been irrigated and cultivated with remarkable success; and tens of thousands of acres more are waiting for the magic touch of water to develop their productive possibilities. Nor is Arizona destitute of water; for several of the finest rivers of the New West traverse its territory. The Pima Indians have raised wheat along the Gila from time immemorial, and yet to-day the land is as good as new. Within two years extensive experiments have been made in the Territory to raise crops *without irrigation*, and fifteen bushels of wheat to the

acre was the result, more than the average per acre in the United States. The following facts will be of interest to the reader: —

"Last year Mr. Isaacs received seven and a half pounds of Early Club wheat from the Granger's Bank in San Francisco, which he cultivated carefully, dropping it by hand, one grain at a time, from which he harvested 2,300 pounds. This season he has forty acres of it, which are counted in with balance of crop at 1,500 and 1,600 pounds per acre. His possessions are: Home place, 400 acres — in alfalfa, 100 acres; eighty acres wheat, 1,500 pounds per acre — 120,000 pounds; 140 acres barley, 1,700 pounds per acre — 238,000 pounds; eight acres oats, 1,500 pounds per acre — 12,000 pounds; garden six acres, 150 fruit-trees, 200 bearing grapes, and three acres sorghum. On place at west end of Grand Canal, farmed by himself and J. B. Barton — 650 acres — there are 400 acres wheat, 1,600 pounds per acre — 640,000 pounds; 250 acres barley, 1,500 pounds per acre — 375,000 pounds. This is the first crop, which is never equal to the second or third."

"M. Meader has 160 acres just north of town, fronting on the Prescott road; has 100 acres in alfalfa and 60 acres in wheat and barley — 1,500 pounds per acres — 90,000 pounds; has 5,000 vines in bearing and 500 fruit-trees, also bearing. He cuts alfalfa for hay; next crop will cut for seed and will make 300 pounds per acre, which will be worth ten cents per pound wholesale. This will make $3,000 for this one crop. Four crops of hay at two tons per acre per crop — 800 tons — which, at eight dollars per ton in stack, will make $6,400, or $9,400 for the 100 acres in this useful plant. Place is all under fence; five strands of barbed wire, making it hog-tight; cottonwood posts all growing."

"John B. Montgomery has 287 acres, highly improved, adjoining town on the south. He has 125 acres in alfalfa and raised 50 acres of wheat and barley. He has a splendid orchard of choice fruit; 1,000 trees, all told, old and young. They range from three to five years old. He has 1,000 grape-vines in bearing. Had ripe pears the 15th of June, and his summer apples were gone a long time ago. He has a dairy of fifty cows, fine stock, breeding nothing but the best. He has a fine Durham bull, imported, whose blood tells in the young stock we saw around the place."

We can add only the following facts: —

"The books of one of Wyoming Territory dairymen, which may be essentially duplicated by scores, show the following for one year: —

Ranch, site, buildings, etc.	$1,200
50 cows at $40; 2 sires at $75	2,150
Two assistants, wages and board	960
50 tons of hay at $6	300
Minor expenses	200
	$4,810
14,000 pounds butter at 40 cents	$5,600
12,000 gallons milk at 30 cents	600
34 calves sold at $10	340
Total	$6,540
Less expenses	4,810
Profit one year	$1,730

"That her soil, climate, and grass render Wyoming peculiarly adapted to the raising of stock, is asserted by those who have tried it, or have noted the similarity of general conditions to some place of established reputation of years as a stock country, and is moreover shown by actual figures. Wyoming pasturage consists of fifty-five thousand square miles upon which cattle subsist the year round, with twenty-five thousand square miles additional, which is unexcelled in summer, while sheltered valleys offer an ever-ready protection to stock in time of storms.

"It has been proven that the cereals, vegetables, and small fruits can be raised with uniform success and at magnificent profits. The area capable of this production includes thirteen million acres, containing these very elements, in constantly renewing quantities, the lack of which the Eastern farmer must supply by plaster of paris, bonedust, etc."

A resident of Washington Territory writes: —

"It has been told abroad that we cannot raise fruit in this section of country, that we are too far north. As a contradiction to this, we state that within twelve miles of this city there are a dozen orchards, all thrifty and bearing. We can give the names of more than fifty farmers who this year have bought young trees, with which to start orchards. Mr. H. N. Muzzy, a mile from town north, has this season set out one thousand apple and two hundred other trees.

"The best contradiction to the assertion that we are too far north, is in the fact that John Rickey, who lives eighty miles north of Spokane Falls, has a large orchard, and last season produced a large quantity of splendid fruit. And still further, there are here on exhibition a few apples forwarded by Judge Labrie, from the seven hundred trees' orchard of F. R. Smith, who lives within a mile of the

forty-ninth parallel, and near Okanagan Lake, a long journey to the north and west of Spokane Falls. These apples are not very large and sound, but of excellent flavor, equal to any fruit produced in Indiana, Ohio, or New York. Mr. Smith had plenty of peaches, plums, pears, and melons during last season.

"R. G. Williamson, who came from Kansas five years ago, has operated a farm five miles east of this place, taking land that was supposed to be almost worthless, has been marketing gooseberries for four years, has cherry-trees two years old, bearing fruit, and peach-trees

LOGGING NEAR OLYMPIA.

in bloom the second year from the planting of the pit. He has prunes, plums, apples, and currants, and has been more fortunate with these fruits here than he was in Kansas. He gives us the names of half-a-dozen neighbors who have been equally fortunate in this respect."

The scene represented above is in the woods, near Olympia, Washington Territory. The most magnificent forests of fir abound in this region, many of them so enormous in bulk as to suggest the "big trees" of Yosemite. This lumber region furnishes a large part of the commerce of Puget Sound, and the lumber business has grown into immense proportions. This fir-tree is found in Oregon as well

as Washington. Nothing but the expense of carrying lumber around Cape Horn to foreign countries prevents a vast amount being transported thither. When the Eads' plan of crossing the Isthmus shall be consummated, the most profitable and largest business of Oregon and Washington will be that of lumber

It is not our purpose to present a view of salmon-fishing on the Columbia River, — one of the most remarkable industries of the New West. But since the preceding illustration presents a great industry of this region, we present one cut to represent the fish-wheel that is used upon that river in the prosecution of a business which is done for the world ; for its products extend to every land and sea.

FISH WHEEL ON THE COLUMBIA.

IRRIGATION.

We have made frequent reference to irrigation in different parts of the New West. Eastern farmers pity the Western farmers, because they are made dependent upon artificial means to supply water ; and Western farmers pity the Eastern, because they must depend upon the uncertain supply of water from the clouds. That the farmers of the New West have the advantage there can be no question. They can command water when they want it. If God were to give the Eastern farmer control of showers and storms, so that by easy act he could bring a shower or storm at his will, he would stand in about

the same relation to a good supply of water that the Rocky Mountain farmer does. The latter defies a drought. He knows that the driest weather will not dry up his crops. The advantage of this arrangement is enforced by the fact that one-fourth of all the crops of the world, on the average, are destroyed by droughts. There are four million acres in Colorado and New Mexico watered only by rains, and they offer poor inducements to men to engage in agriculture. But irrigation removes this insuperable obstacle, and causes sage-bush land to yield like a garden.

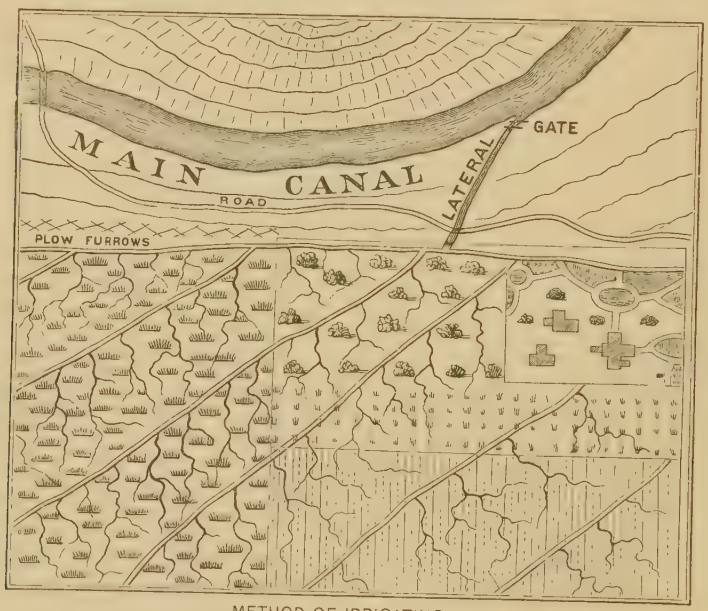
IRRIGATING.

Originally one farmer alone, or several unitedly, met the expense of irrigation. But now large companies are organized to make money by selling water to farmers. Also large companies buy immense tracts of land, and when they have brought it under irrigation, cut it up into farms for sale. Some facts that follow will interest the reader in this subject of irrigation.

A writer says: "Irrigation is simply scientific farming. The tiller of the soil is not left at the mercy of fortuitous rains. His capital and labor are not risked upon an adventure. He can plan with all the certainty and confidence of a mechanic. He is a chemist, whose laboratory is a certain area of land; everything but the water is at hand, — the bright sun, the potash and other mineral ingredients (not washed out of the soil by centuries of rain). His climate secures him always from an excess of moisture, and what nature fails to yield, greater or less, according to the season, the farmer supplies from his irrigating canal, and with it he introduces, without other labor, the most valuable fertilizing ingredients, with which the water, in its course through the mountains, has become charged."

A writer in Kansas describes an irrigating ditch as follows: —

"Last week I visited Spearville, and called at the camp of the Irrigating Ditch Company; I was kindly instructed in regard to the project by John Gilbert, of that city, who has the work in charge. The ditch begins above Cimarron, passes just north of Spearville, and re-enters the Arkansas at Kinsley. It is ninety-five miles long, forty-five feet wide, and twelve feet deep. The main ditch is now completed, and they are at work on the side ditches. It has a capacity to carry water for one-half million acres.



METHOD OF IRRIGATING.

"They have seven ditch-ploughs, which are quite a contrivance. The plough is set in a heavy frame, and throws the dirt on a heavy canvas, twenty-two feet long, which can be set at any angle, and thus carry the dirt from the bottom of the ditch to the top of the embankment. It is propelled by twelve horses, — eight in front and four behind, — and requires three men to operate it — two to drive and one to attend to the machinery. Each plough costs one thousand dollars. There are eight hundred thousand dollars in stock in the company now, and Dr. Soule, the proprietor of Hop Bitters, is advancing most of the capital. He is said to be worth millions, which he has made out of the above-mentioned medicine; so that if the

ditch proves a success, as it probably will, it may be truthfully said that Southwestern Kansas is irrigated with Hop Bitters."

"The method of applying water to fields is illustrated by the above sketch, showing the main canal, the lateral taken out of it, and the small distributing laterals running through the various fields. This is the flooding system, which is generally practised by Colorado farmers. The distributing laterals are simply cut by a hoe or spade, and the water allowed to flow out and spread over the surface as far as it will go and sink as deep as may be necessary to give the required moisture to the roots of the growing grain. It will be seen that one man can look after the distribution of water over a large area by this crude but effectual method, since the main lateral is sufficiently large to supply a number of distributing ones that directly reach the growing grain, which is generally sown in drills. When the field is sufficiently watered the cuts are closed up by throwing a shovelful of dirt against the gap, and the water allowed to flow to a different part of the field; and so on, until the whole field is irrigated.

"There is another method, used when corn or potatoes or other crops are growing; it is called the furrow method, the water following the hollow between the rows made by throwing the soil on either side with a shovel-plough. The water seeps down and sideways, readily reaching the roots to be benefited by it. This method is also adopted in orchards and vineyards, as well as small fruit gardens."

We have spoken of San Luis Park, and its deep, rich soil. The State Land, No. 2, Canal Company has opened one hundred twenty-five thousand acres of land in that park by bringing it under irrigation. The following picture shows the headgate.

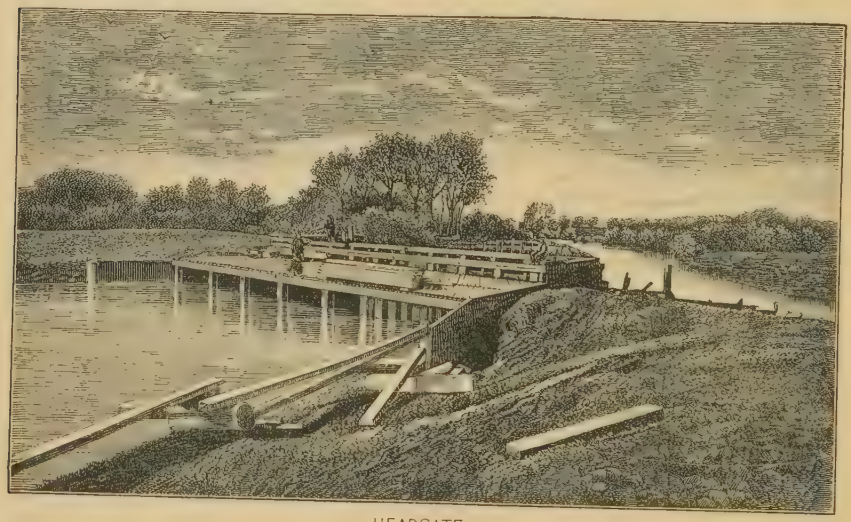
Other irrigating companies bring other thousands of acres of land in this wonderful park into the market. Farmers can purchase the best of land here, as much or little as they want, at very low figures, all well-watered, and waiting "to be tickled with a hoe."

Colorado has more than one thousand miles of irrigating canals and ditches, which can water well one million five hundred thousand acres. These lands can be purchased for from one dollar twenty-five cents to two dollars fifty cents per acre, the latter being the Government price for lands where there is a railroad land grant. The large canal corporations of the State control three hundred thousand acres which they offer for sale at from four to fifteen dollars per acre according to location.

The rainfall in Colorado is about fourteen inches for the year, which is insufficient, of course, for agricultural purposes. For expe-

rience has proved that the amount of water necessary during the cropping season when irrigation is required, is equivalent to thirty inches deep upon the land if it were applied all at once; or that one cubic foot per second flowing night and day for one hundred days will irrigate eighty acres of land. Moreover, this water from the mountains contains a natural fertilizer peculiar to itself, which constantly enriches the soil.

The two large irrigating companies of Colorado are the Loan and Trust Company, and the Platte Land Company. The first has constructed ten large canals, — one of them, the Del Norte, the largest in the world. The principal canal is one hundred feet wide, and has fifty-six miles of constructed channel, and ninety miles of the Sag-



HEADGATE.

wache branch canal included. It delivers two thousand five hundred cubic feet of water per second, or one billion six hundred twenty million gallons every twenty-four hours. There were one million seven hundred fifty thousand cubic yards of gravel, rock, and earth excavated from the channel, requiring an army of three thousand five hundred men and two thousand teams to perform the great work. The largest canal in Italy — the Naviglio Grande — is but half as large as the Del Norte, and cost twelve million dollars.

The "Big Greeley Ditch," as it is called, is on the north side of the Cache la Poudre River. It is thirty-six miles long, with three to three and one-half feet depth of water, and is twenty-five feet wide on the bottom at its head, diminishing to fifteen feet at Greeley.

Its fall is from two and a half to three and a half feet per mile. The cost of this irrigating canal was sixty-six thousand dollars. Another ditch, on the south of the river, is eleven miles long, and twelve feet wide at the bottom, with two and one-half feet depth of water.

Tree-culture increases rapidly in California and other parts of the New West, by irrigation; and its profits, as we have seen, are somewhat marvellous. The next illustration shows the process of irrigating trees, which is usually done but three or four times during the season. Rev. Robert Strong, of Westminster, Cal., gathered eight hundred pounds of apples from one Rhode Island Greening tree, which he sold for sixteen dollars. One ranch in Los Angeles County has sixteen thousand orange and lemon trees, two thousand pomegranates, three thousand English walnut, five thousand almond, three thousand peach, four thousand pear, two thousand apricot, one thousand fig, with twelve hundred acres in grape-vines, — all under a complete system of irrigation.

A new method of irrigation has been introduced into Southern California, called "underground irrigation." A writer describes it as follows: —

"We have spoken now only of surface irrigation. Where water is scarce, as in some of the extreme southern counties, or where there is more good land than can be well irrigated from the streams by surface irrigation, a system of underground irrigation has been adopted.

"It should perhaps be explained, for the benefit of those who have always lived in a wet country, that when water is run over the soil under a very dry atmosphere and a cloudless sky, evaporation is very great; so great, indeed, that when water is scarce it becomes an object to prevent this evaporation, and thus secure all the benefit of all the water for the use of the growing crop.

"To meet this want an underground system of irrigation by perforated pipes has been invented and put in use, and is proving of immense benefit. The pipe is now generally made of concrete. The ditches are dug (say) fifteen to twenty feet apart over the field, or in the middle of the space between the rows of trees in an orchard, and by a machine having a feeding hopper, the concrete, ready mixed, is fed into the hopper, and the machine converts it into the required size pipe, and at the same time moves along in the ditch, leaving the pipe behind it. The same machinery perforates the pipe, so that the water is let out of it in quantities required, the pipe being from one and a half to three feet below the surface.

IRRIGATING AN ORCHARD.

The cost of irrigation and amount of water necessary to be applied to an acre depends upon the method by which water is applied (four methods are used in the New West), the nature of the soil, and the kind of crop. The cost of water per acre in Colorado, by flooding, is from a dollar and a half to three dollars per acre.

The check system prevails in California and New Mexico in applying water, and a cubic foot of water is made to irrigate seventy acres, while by flooding, a cubic foot of water will irrigate but sixty acres. By the check system the land is divided into squares by ridges, into one of which the water is admitted and allowed to run until it is completely covered. Then the water is conducted into the adjoining square by cutting a small channel through the ridge. This system requires some labor, but decided economy in the use of water is gained.

Artesian wells have served a good purpose in irrigating the land, not only in California, but in other parts of the New West, also. In 1882 twelve artesian wells were sunk in Tulare County, Cal., resulting in a complete revolution in agriculture. These wells flowed nearly one million five hundred thousand gallons daily; and the desert lands were converted into wheat-fields, vineyards, and orchards of wonderful thrift. Similar wells with similar results have been multiplied in Colorado, Arizona, New Mexico, and Nevada.

We add only the following facts concerning irrigation in Western Kansas: —

"Now, a word or two as to what has been done. Last year one farmer sold one thousand three hundred dollars' worth of onions and sweet potatoes from four acres. He irrigated the ground four times. Another man harvested ten acres of oats, which he irrigated three times. He got an average of a little over sixty bushels per acre, weighing forty pounds to the bushel. Another farmer had in eight acres of oats; watered six acres three times and the other two acres not at all, and got an average of sixty-six bushels to the acre. One man raised five hundred bushels of onions on one and one-sixteenth acres. Still another harvested nine tons per acre from five acres of alfalfa, cutting it three times during the summer. The last cutting was after the grass had gone to seed. It yielded twenty-one bushels of seed per acre. Two miles west of town, Squire Worrel has a fine orchard. Other farmers have done well with fruit. From such figures the reader may get some idea of what can be accomplished by irrigation."

CONCLUSION.

We have caught a glimpse of the New West. Compared with the aggregate realities of the wonderful regions, it is only a glimpse. We have seen enough, however, to satisfy us that it is a veritable "Wonderland," as crowded with OPPORTUNITIES as it is with marvels. Men live rapidly here — a whole month in one day, a whole year in a month. Some have lived a hundred years in the twenty-five or thirty they have spent here. They have seen an empire rise and grow rich and powerful in that time. The changes wrought under their own eyes have been almost as startling as transformations under the wand of a magician, — such strides of progress as usually exist only in dreams. It seems as if God had concentrated His wisdom and power upon this part of our country, to make it His crowning work of modern civilization on this Western Continent. For its history is Providence illustrated, — God in the affairs of men to exhibit the grandeur of human enterprise and the glory of human achievement.

When sojourning on the Pacific Slope, bewildered by its marvels, the question arose, Why did the settlement of our country begin in the East instead of in the West? Why did the "Pilgrim Fathers" land on the coast of New England instead of the coast of California? Why seek their fortunes among the rocks of Plymouth instead of the gold mines of the Pacific coast? The same hand that guided them to the "rock-bound shores" of the Atlantic might have led them to the "gold-fretted shores" of the Pacific. There is no solution to the problem except in the wonder-working Providence of God. On this continent was to be built up the largest, richest, most intelligent, and powerful Christian nation on earth. A fearless, self-sacrificing, intelligent, hardy Christian race, disciplined by perils and hardships indescribable, could alone lay the foundations and work out the grand problem. Hence, rocks were better for them than nuggets of gold. A soil that would yield bread enough to keep the wolf of hunger from the door only by constant "sweat of the brow" was indispensable, rather than a soil that would yield the necessaries of life and luxuries of the tropics in profusion, with little care and labor. Nothing but hunger and nakedness forced them to plunge still further into the wilderness, as the population increased, at the risk of being devoured by wild beasts or slain by savages. Beset with troubles on every side, and harassed by dangers that required the stoutest courage to meet, the higher and noble attributes of humanity were

forced to the front, as, from generation to generation, "westward the star of empire took its way."

Had the Pilgrims landed at San Francisco instead of Plymouth, and the treasure-vaults of California been opened by their enterprise, as they opened to their descendants in 1848, doubtless the race would have been enervated by the luxury, extravagance, and ease which usually succeed sudden transition from poverty to wealth. Finding a rich soil that yielded sixty and a hundred fold with a quarter part of the labor required to secure a scanty subsistence on the coast of New England, the goading incentive to work or starve would have been removed, followed by idleness, prodigality, and effeminacy. Not being forced to push out into the wilderness, further and further, to obtain the means of living, it is doubtful if New England would have been settled to-day. For, with every factor in the problem of creating and building up a great Christian nation, beginning at the East, favoring the purpose, generations lived and died before the occupation of the New West was thought to be possible; and not until within forty years did the children of the Pilgrim Fathers set themselves to work to complete their empire by transforming the Western wilderness into a capstone of gold.

Reverse the opportunity; begin the experiment at the West instead of the East; supply gold for granite, and a rich for a barren soil; let plenty take the place of poverty, and men command the means of a livelihood without stress of plan or labor; and what reason have we to believe that they would have left the Eldorado discovered, and penetrated the wilderness, crossing the Missouri and Mississippi rivers and the "Great Lakes," felling vast forests, building towns and cities by Herculean labors, and finally reaching the Atlantic coast to make the New England of to-day? Such a result is not supposable. All the conditions indicate that in the Divine Plan it was absolutely necessary to lay the foundations in granite that the superstructure might be finished in gold. Neither science, art, learning, or religion were competent to handle such marvellous wealth as lay concealed within the domain of the New West. When "the fulness of time" came, religion and learning, science and art, commerce and enterprise, had multiplied their institutions and power so wonderfully, that they could employ the millions and billions of wealth marvellously evolved to lift up humanity, and contribute to the more rapid growth of a model Christian civilization. Such a use of treasure was impossible two hundred years ago.

Andrew Carnegie, a native of Great Britain, but an adopted son

of the United States, opens his very able and valuable work, "Triumphant Democracy," with the following paragraph: —

"The old nations of the earth creep on at a snail's pace; the Republic thunders past with the rush of the express. The United States, the growth of a single century, has already reached the foremost rank among nations, and is destined soon to out-distance all others in the race. In population, in wealth, in annual saving, and in public credit, in freedom from debt, in agriculture, and in manufactures, America already leads the civilized world.

"France, with her fertile plains and sunny skies, requires a hundred and sixty years to grow two Frenchmen where one grew before. Great Britain, whose rate of increase is greater than that of any other European nation, takes seventy years to double her population. The Republic has repeatedly doubled hers in twenty-five years."

He closes his remarkable volume by the following statements among many others: —

"The wealthiest nation in the world."

"The nation first in public credit and in payment of debt."

"The greatest agricultural nation in the world."

"The greatest mining nation in the world."

But the New West has made this result possible. Its mines, farms, flocks, and herds, and exceptionable enterprise contribute enough to the Republic's grand total of possessions to make these statements indisputable. The United States incurred a debt of three billion dollars in self-defence against the slaveholders' rebellion, and the riches of the New West has enabled the government to liquidate more than half of it already; and the time is near when the last dollar of it will be paid because of the great wealth that is stored in Western vaults. Devote to the liquidation of the national debt the annual product of the mines between the Missouri River and the Pacific coast, and in less than ten years the debt would be extinguished. Or, devote the vast annual income of the cattle-ranches, which cover so large a portion of this great domain, to the same purpose, and in an equally brief period our national liabilities would wholly disappear. Or, annually appropriate the aggregate profits of agriculture and commerce within this large and booming territory to the removal of this burden of indebtedness, and in less time than we have named the nation would witness its extinguishment, and celebrate the occasion with bonfires and illuminations.

The author of "Triumphant Democracy" says, again: "Why does the credit of this new Republic stand higher than that of old England?

Why would the world lend this young Democracy more money and upon better terms than it would lend the old monarchy? Why does the world pay for American three per cents more than it will pay for the British three per cents? The answer is obvious. Because the reign of the whole of the people of a state is more secure than the reign of any class in a state can possibly be. A class may be upset, nay, is sure to be sooner or later; the people are forever and ever in power."

Then the writer goes on to multiply telling facts, and finally adds: "The answer to doubters of the stability of Democracy, like Sir Henry Maine, is here: December, 1885, —

"Republican three per cents, 103½.

"Monarchial three per cents, 99½.

"Were the consuls of America perpetual, like those of Britain, and not redeemable at a fixed date, their value would be still higher.

"It has been the boast, one of the many proud boasts, of the parent land, that her institutions were stable as the rock, as proved by her consuls, which stood pre-eminent throughout the world. Now comes her Republican child, and plucks from her queenly head the golden round of public credit as hers of right, and places it upon her own fair brow. It has been my privilege to claim victories for triumphant Democracy, but surely the world will join me in saying none is more surprising than this, that its public credit stands before that of Great Britain and first in all the world."

This is a flattering tribute to our country, of which the New West may not be diffident to claim its share. For this remarkable consummation of public affairs, especially the financial triumphs, could not have been reached in the present century but for the settlement and development of this marvellous country. And still more in the future than in the past, will the expanding resources of the New West exalt the national credit, until the Republic shall be as widely known for its population of a thousand millions as for its fabulous wealth.

These facts indicate that the New West will decide the destiny of our land, and that, too, on the line of unparallelled growth and prosperity. Perils beset this portion of our country, it is true, perils of such fearful magnitude as to awaken alarm; but this is God's battle, in which "one will chase a thousand, and two put ten thousand to flight." But for this unassailable truth the Republic would not stand at the head of nations in wealth and population, or anything else, to-day. From the outset this is what the world has witnessed

on this Western Continent, — "two putting ten thousand to flight." And this must continue, if the Divine Plan is to build up a mighty Christian nation here, until the Republic stands complete in its beauty and glory. If the New West shall fail of the achievements predicted, the Republic will fail to maintain its advanced rank among the nations; and if the Republic fails, mankind will fail also. The prediction that the unprecedented mixture of nationalities in the New West will compromise, and possibly destroy, its noblest institutions, will not be fulfilled, since the manifest drift of affairs is to the absorption of all other races by the Anglo-Saxons, who now control the destiny of the human family. This English-speaking portion of mankind never even nods to foreign tongues, but the latter are constantly being absorbed by the former. We have an amusing jargon of languages now; but the time is coming when the French, German, Irish, Spanish, and every other nationality will join our English-speaking people, and we shall have but one tongue spoken from the Atlantic to the Pacific, and from the Lakes to the Gulf. Besides, the representatives of these many nations in the New West are the most intelligent, enterprising, and industrious of their countrymen. Comparatively few tramps and worthless characters are among them. The mass of them emigrate thither for homes and a livelihood, and multitudes become farmers, scattered over the States and Territories under circumstances peculiarly favorable to the development of good citizenship. Nor can we disprove Herbert Spencer's prediction that this conglomeration of races will result in a higher type of manhood than now appears upon the continent. Mr. Spencer says: —

"From biological truths it may be inferred that the eventual mixture of the allied varieties of the Aryan race forming the population will produce a finer type of man than has hitherto existed, and a type of man more plastic, more adaptable, more capable of undergoing the modifications needful for complete social life. I think that, whatever difficulties they may have to surmount, and whatever tribulations they may have to pass through, the Americans may reasonably look forward to a time when they will have produced a civilization grander than any the world has known." Our hope and expectation is that Herbert Spencer will turn out a true prophet.

The liquor traffic is the prolific cause of evil in the New West, as it is in the East; and yet, in its centres of population, it is divested of some of the frightful characteristics which make it so horrible to contemplate in Boston, New York, Cincinnati, Chicago, and St. Louis. The intelligence, enterprise, and Christian principle

there are opposed to the traffic. Already Kansas has led the way to a Constitutional Amendment, forever prohibiting the manufacture and sale of intoxicating beverages within its limits, and the States of the East are fast copying its example. So that, in the solution of the liquor problem, it appears to many that deliverance for the East is to come from the New West. The very favorable results of the experiment in Kansas, ridding the commonwealth of the most dangerous class of citizens, inviting a better and nobler class of immigrants to settle there, where the curse of the traffic does not rest as a pall upon every industry, increasing population, wealth, and business to an unprecedented degree, will demonstrate to every State and Territory further west the practicability and absolute necessity of stamping out a trade that is "the dynamite of modern civilization." It is probable that, earlier than in many parts of the East, the New West will put the liquor traffic under the ban of prohibitive legislation, thereby removing one of the greatest barriers to its thrift and triumph.

Mammonism, Mormonism, Socialism, Skepticism, and Atheism are mighty obstacles to the rise and progress of our Western domain; but the holy trinity of Liberty, Education, and Christianity, in which the Anglo-Saxon race believe, will prove more than a match for them all in the future conflict for supremacy. This race has laid the foundation of our Western empire, and started it off in a career of unexampled prosperity; and its grip upon the masses will not be relaxed as the battle for unity and right waxes hotter; but will rather tighten its hold and increase its power, until language, custom, and purpose are one, under the control of Liberty, Education, and Religion. An Englishman says, "Every one is looking forward with eager and impatient expectation to that destined moment when America will give law to the rest of the world." This consummation will be realized when Anglo-Saxon supremacy over the New West shall bring its multiform elements into complete accord for the Union, and the Christian Religion shall control the whole for Humanity and God.

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